Fooling the Fungus Fairy

Yesterday your veggies and flowers were lovely. Today some of them are covered in white, black or rust blotches or lesions. The leaves have lost their vigor and are discolored and misshapen. Fungus has arrived! This is one of the most common and frustrating of garden diseases. Good gardening practices will help you prevent it, but every garden needs a plan of attack when the ugly fungus fairy arrives!

For diseases to occur, plant pathogens must come in contact with a susceptible host plant. Pathogens can be carried to the plants by various means, including transplants, soil, humans, animals, insects, infested seed, and wind and water. Favorable environmental conditions must be present for the plant pathogen to infect and thrive on the plant. Fungi cause most garden diseases: 8,000 species are known plant pathogens and either inhabit the above ground portions of plants or are denizens of the soil.

The most common garden fungus diseases are powdery mildew, black spot, rust, and sooty mold. These diseases are found on both ornamental and vegetable plants. They are most problematic during the spring and fall seasons due to temperature and humidity fluctuations.

Following these easy steps will help eliminate most of your garden diseases.

1. Select high quality plants and seeds. Select plants with healthy-looking leaves and strong stems. If you collect your own seeds, be sure to collect from disease free plants and store the seeds properly.

2. Do not plant too early. Plant growth may be slowed by cold temperatures. Slow-growing plants are more susceptible to attack by disease-causing organisms and insect pests.

3. Rotate crops. Grow your crops in different parts of the garden each year. Be sure not to rotate crops with those in the same plant family (e.g., peppers, eggplant and tomatoes; cauliflower, cabbage and broccoli).

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4. Avoid over-crowding the plants. Crowding plants creates a moist, humid environment that is favorable to diseases.

5. Water early in the day. Plants that remain wet throughout the night are more susceptible to disease. Don't over water.

6. Remove diseased leaves, flowers, and fruits as soon as they are noticed. Disease is easily spread by wind, rain, and overhead watering.

7. Mulch. Mulches prevent soil that may harbor disease-causing organisms from splashing on to plants: mulches also help to suppress weeds and retain soil moisture.

8. Fertilize carefully. Fertilize to promote the desired growth and health of the plant. Avoid over-fertilization. Too much nitrogen promotes tender, fast growth, which is susceptible to attack by fungi, bacteria and insects.

9. Keep insects and insect damage to a minimum. Insect wounds provide entry points for disease-causing organisms. Insect infestations weaken plants, and invite disease. Sooty mold is a dark fungus that grows on the honeydew excrement of sucking insects like aphids and scale.

10. Practice good garden sanitation. Always start with a clean planting site. Diseases from the previous season's crop may harbor insects and diseases.

If in spite of all your effort, the ugly fungus fairy visits your garden, there are remedies. There are a variety of fungicides. Fungicides act as barriers between pathogens and plant tissues and must be applied before new leaves or other susceptible plant parts appear. Apply fungicide at the first sign of the disease or when weather conditions are favorable for disease. (See a further notes about fungicide options on page 16).

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**Tea Time in the Garden**

Brewing and Using Actively Aerated Compost Tea

I have had a rather passive compost pile for years and more recently have acquired an active vermi-composting box. Both are great ways to recycle vegetative matter both from the garden and the kitchen, but I have never been very good at applying the output to my yard. Basically, a couple of times a year I would spread either the composted matter or vermi-castings around my plants and dig it in. Often it wasn't much, and it never went as far as I had hoped. Recently, though, I have learned about Actively Aerated Compost Tea (AACT), and things are beginning to look up.

For centuries, farmers and gardeners have been making manure teas and compost extract as well as using compost leachate (the dark solution that leaches from the bottom of the compost heap). These teas and extracts generally were made by suspending a burlap bag of manure or compost in a barrel of water for a couple of weeks. The use of manure teas, especially on vegetables, is frowned upon these days because of the possible presence of harmful bacteria, but applying passively brewed compost extracts is an acceptable way to supply soluble nutrients to plants.

Actively Aerated Compost Tea is different from passively brewed teas in that the extract is actively bubbled and fed, so that

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Some Benefits of Compost Tea Include:

- Increases nutrient cycling in the rhizosphere (area around the roots)
- Disease-suppression
- Helps extend root systems
- Increases water and nutrient retention
- Is 100% safe and natural and cannot be overapplied
- Creates healthier plants
- Helps breakdown of toxins in the soil and on the plants
- Enhances the taste of fruits and vegetables (raises brix levels)

Pennsylvania Dept. of Environmental Protection

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it will grow microorganisms that are beneficial to the soil food web and the plants themselves (see box). Aeration provides oxygen for the aerobic bacteria and keeps the brew from going anaerobic (i.e. lacking in oxygen), which can be harmful to plants. If the tea has gone anaerobic, it will smell bad. AACT should smell good and earthy.

Depending on how much compost you have, how much yard, and what kind of set-up you want to build, you can brew a batch as small as 5 gallons or large enough to support a commercial farming operation. You can buy large, quick sophisticated brewers, or you can make one of your own. In fact, building your own AACT system is quite simple. Basically, all you need is a source of good compost, a 5 gallon bucket, an aquarium pump, some plastic tubing, a couple of aquarium air stones, a porous bag of some sort, and molasses and/or other catalyst foods (kelp, humic acid, fish powder, etc.) to suit your purposes.

I brew my tea in a 5-gallon crock instead of a bucket, which has the added advantage of insulating the AACT a bit while it is brewing on these warmer days. I set up my system with an air pump that has two air outlets, and I added two gang valves with 2 slots each so that I could divide the two main lines once more, i.e., into four lines. I connected 4-inch air stones, or bubblers, to two of the lines, and I dropped those down to the bottom of the water. On each of the other two lines, I added a T-connector that allowed me to add two smaller bubblers to each line. One of those I put inside the tea bag; the other hangs down midway in the crock. Some people lay a coil of soaker hose around the bottom of the bucket instead of the bubblers and say that evens out the aeration even more. I haven’t tried that yet.

After adding water to the crock, within a couple inches of the top, I let the water bubble for 2 or 3 hours in order to de-chlorinate it. You could also just let it stand for a day if that works better for you, or you could get water from a non-chlorinated source. After the water is ready, I add the tea bag that I have made. I use a paint-straining bag, though other people use nylon stockings, socks, pillow cases or burlap bags. Still other people prefer to just dump the compost in the crock and strain it later. I use vermi-castings for my AACT and put about 4 cups in the paint-straining bag that I tie and hang into the 5-gallon crock. Then I let it bubble for 24 hours. After that, I add a couple of tablespoons of organic, unsulfured molasses to feed the bacteria, and I let it go for a couple more days. By then, it smells good, looks rich and is ready to use.

When it is ready, I shut off the air pump and disconnect the tubing, which I drop immediately into a bucket of water. I remove the tea bag and set it in the garden somewhere, and I let the brew settle out for 10-20 minutes while I clean up the tubes and bubblers. If I am not using them right away, I add a little 3% hydrogen peroxide to the soak. Then, using a watering can, I sprinkle the tea directly on the foliage of my plants, or I pour it on the soil around them. I do the sprinkling in the morning when the weather is cooler and the plants more accepting. When I am finished, I usually dig the solids into my garden somewhere, or I put them in the compost pile.

My AACT, which has been aerated for 3-4 days, came from vermi-castings, and was fed molasses, is probably dominated by bacteria, which is good for vegetables, annuals, and lawns. If I wanted something better for perennials, trees, shrubs, or berries, I would want to manipulate the brew so that it would be more fungi-dominated. And there are ways of doing that. In fact, it has been said that there are as many recipes for compost tea as there are for chili in Texas. The basic formula though is usually the same, and some basic tenets always apply: to make good tea, use good compost and a
good bubbler. Brew it for at least 24 hours, and feed it if you brew it longer. For optimum benefit, apply the AACT within 4-6 hours from the time you disconnect the system. If it smells bad, don't use it.

How often and how much AACT you should apply to your garden really depends on how much compost you have, how much time you can spend, and what condition your yard is in. You really cannot spray on too much. If you have ever used chemical fertilizers, you probably will need more if you are trying to reestablish a healthy soil food web.

I continue to read and learn about how to brew the best AACT. One of the best resources I use is *Teaming with Microbes* by Jeff Lowenfels & Wayne Lewis (Timber Press, Inc: Portland, OR, 2006). Another is an online Yahoo group [http://tech.groups.yahoo.com/group/compost_tea/](http://tech.groups.yahoo.com/group/compost_tea/) that offers a lively discussion of everything having to do with AACT and is an easy place to ask questions and expect an educated response. Also, the Pennsylvania Department of Environmental Protection will give you the basics at [http://www.dep.state.pa.us/dep/deputate/airwaste/wm/recycle/Tea/tea1.htm](http://www.dep.state.pa.us/dep/deputate/airwaste/wm/recycle/Tea/tea1.htm). Additionally, you can find some interesting demonstrations on You Tube. As for me, the next thing I need to do, other than getting another batch started and watching my rejuvenated garden grow, is finding a good microscope that will give me an even closer look at what I am brewing.

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**The Lunatic Gardener’s Guide to Water Gardens**

*David Studer, Yolo County Master Gardener*

**W**ater gardens or ponds bring a cool lushness and a soothing burble to the garden. They invite butterflies, birds and dragonflies to drink, bathe, and play. To add a pond to your yard, follow these basic steps:

1. Dig a hole.
2. Make it bigger.
3. Get it to hold water.
4. Naturalize with rocks.
5. Install a circulation system—filter, pump, waterfall.
6. Introduce plants and fish.
7. Kick back in the shade with a margarita and enjoy the view.

Sounds easy, doesn’t it? Let’s look a little closer. Plan first. Size matters—so does location. Select the size and location of your pond to fit into your garden scheme. Decide early in the process how much of your garden you want to devote to a pond. Water gardens are best in a sunny spot because most water plants, the good ones anyway, like sunshine. Keep the pond away from plants with invasive roots and shoots, like bamboo. Locate the pond in a place where you can enjoy both the sight and the sound.

Check the local permit requirements. In Davis, a pond deeper than 18 inches is a pool—no matter who or what swims in it. Pool permits require self locking gates, alarmed doors, ten foot setbacks from all fences and the electrical outlet at least ten feet away from the water's edge. Even without a permit, these are good things to consider. Municipalities differ so check before you start to dig. Finally, be aware of underground utilities. Digging up the gas line is no fun.

NOW, dig a hole. The Lunatic Gardener’s do-it-yourself pioneering spirit mandates a shovel. Digging after the winter rain has softened the ground makes this step much easier.

Make it bigger. It is difficult to find a water gardener who would say, “If I had to start over I would make the pond smaller.” Remember that fish need at least a 2 foot depth to escape predators like raccoons, cats, herons and egrets.
Get it to hold water. Most water garden websites feature calculators for estimating the size for pond liners depending on the average width, length, and depth of the pond. For smaller projects, many pond supply places offer pre-formed pond shells. They come in a variety of shapes and it is possible to link several on a slope with waterfalls. Underlayment provides a soft surface for the pond liner to rest on. It helps prevent plant roots and sharp rocks from puncturing the liner. Most pond supply places sell a felt-like material that does the trick nicely. One can also use sand. This works well under pre-formed pond shells.

Naturalize with rocks. Rocks form a natural transition between the pond and the surrounding landscape. They hold down and hide the edge of the pond liner or shell and can be softened by tucking plants into the gaps between them for a natural look. The local landscape supply yards provide a variety of options for rock. Many are quarried and trucked to Sacramento. Local river cobble works well and is easier on the environment.

If you don't have children, nieces, and nephews are handy for getting the rock into the pond—especially young, energetic ones. With proper incentives, friends and neighbors also work well. It's amazing what the offer of pizza and soda can do! Many of the Lunatic Gardener's helpers pitched in just so that they could judge for themselves the depths of his lunacy.

Install the plumbing. Without circulation, your pond becomes a stinking mosquito farm. The circulating system draws pond water into the filter through an intake located on the bottom of the pond or a skimmer at the surface of the water—or both. The filter traps large bits of debris and protects the pump from damage. The pump keeps the water circulating and returns the water to the pond through an outlet (waterfall or fountain). Tubing connects these elements together into a system that should be installed before adding water to the pond.

Do not skimp on the pump. It should be big enough to circulate the entire volume of water once each hour. A 2,400 gallon pond should have at least a 2,400 gallon per hour (GPH) flow rate. The distance and elevation gain between the pump and the waterfall increases the demand on the pump—so plan accordingly.

Introduce plants and fish. Water gardens without plants are frequently called swimming pools and require chemicals. Aquatic plants help keep the water clean and come in three types. Bog plants like western blue iris (Iris missouriensis), Siberian iris (Iris sibirica) and pickerel weed (Pontederia cordata) live on the edge of the pond or in shallow water. Floating plants have their roots in containers of soil at the bottom of the pond but their leaves and flowers either float on the surface or stick up above the surface. Hardy varieties of water lilies (nymphaea) are popular. Submerged plants live almost entirely underwater. Waterweed (Elodea canadensis), also sold as anacharis, and coontail (Ceratophyllum demersum) make great oxygenators that are important to healthy ponds.

Fish eat mosquito larvae. Even Martha Stewart would say this is a good thing. Circulating water will discourage mosquitoes from laying eggs in the pond. The larvae must have a "smooth as glass" water surface in order to breathe. Fish will take care of those mosquitoes that ignore the "smooth as glass" rules. If you are not sure about fish at first, stay cheap. The county mosquito abatement district will seed your pond with mosquito fish or guppies for free. Call and ask. Many water gardeners like goldfish. While mosquito fish and guppies will stay fairly small and remain nearly invisible in the pond, goldfish get up to 1½ feet in length providing additional visual interest.

Koi, developed from common carp in 1820s Japan, will be friends for life. Seriously, they can live for 35 to 50 years and grow to three feet in length. You don't believe it? Follow this link: About Koi Fish. Do some research before making a commitment to Koi.

Most municipal water supplies contain chlorine to maintain water purity. Wait several days after filling the pond before introducing fish to allow the chlorine to dissipate. Allow the temperature in the container they came in to adjust to the temperature in the pond by floating it in the pond for a short time before releasing them. The fish will thank you for this and will better adjust to their new surroundings.

Now, where's that margarita? ☛
Espalier is a method of training trees through pruning, shaping, and grafting tree limbs in order either to make a tree fit into a small space, or to create decorative and artistic patterns, such as the Belgian Fence, Double U Shape, candelabra, or fan. Espaliering is actually easier than it looks. Once you have the branches where you want them, it is just a matter of time and pruning judiciously.

There are horizontal techniques where the branches grow horizontally out of one central trunk, or you can shape the branches into menorahs or candelabras. In a Palmette the branches grow in a fan-shaped pattern from a low central trunk, or you can interweave branches of several trees growing upwards to form a continuous fence. Espalier can also be used as a landscaping technique to decorate solid walls by growing shaped trees near them. Using cordon shaping, you can train the tree to resemble objects, such as hearts, baskets, pyramids, diamonds, cork screws, S-shaped strings etc. After a number of years you can get limb junctions to fuse together, if that is what you desire.

Biodegradable ribbon or tubes are used to hold the shape you bend the branches into. Tie the branch to a wooden or metal grid behind the tree; the support is removed once the tree has reached its desired shape. On initial shaping you can either tie the branch loosely or retie it periodically to accommodate the branch as it grows during the year. If you work on complex patterns, do not overstress the branches because they could crack or break. A complex shape can take years to achieve.

An espalier tree collects almost as much sunlight as a regular tree, yet has less mass. This makes them ideal for decorative purposes and for gardens with limited space. The technique is ancient and can be adapted commercially. In Italy, for example, apple trees are sometimes grown on trellises in rows similar to how grapes are grown in a vineyard. For residential situations, trees can be planted next to a south-facing wall, which reflects sunlight and retains heat overnight, thus allowing an espalier to succeed in cooler climates, where a non-espaliered tree of the same variety might fail. Espalier fruit trees usually mature more quickly and tend to have a shorter life span than naturally growing trees, but they use less space, which can be important when space is limited.

Certain types of trees adapt better to this technique than others, although any fruit tree could theoretically work. One criteria is that the branches of the plant must be long and flexible. Examples of trees that take well to espalier are olives, apples, pears, and figs. While peaches, plums, apricots, walnuts, and cherries can be grown flat against a wall, they are generally happier in less structured forms than those that can be used for apples and pears. The shapes that can be achieved are only limited by your imagination and the amount of training you subject the tree to.

An Espalier tree needs to be carefully pruned every year in order to maintain its shape and beauty, but it will undoubtedly become a noticeable focal point in your garden.
More Reasons To Respect Plants: Poisons!

What do the following have in common: apple, castor bean, foxglove, potato, oleander, and rhubarb?

*Poisonous Plants of California* includes castor bean, foxglove, and oleander in its list of "plants seriously poisonous to humans." Castor bean seeds yield harmless castor bean oil and one of the most poisonous chemicals known, ricin. The entire foxglove plant is toxic, but digitalis is produced from the leaves to treat heart ailments. All parts of oleander are toxic, but it is as common as speeders along roadways. Apple pie is heaven on a plate, but the seeds are poisonous. Irish potatoes have been cultivated for thousands of years, yet toxic green skin and sprouts on tubers should be removed before cooking. Rhubarb stalks (petioles) are a delicacy, but the leaf blades are poisonous.

Why are some plants or plant parts injurious? Spines, irritating hairs, and toxins are examples of plant defense mechanisms. Without them, few animals would exist since plants would be decimated by herbivores.

So, why are more of us not gasping for our last breath after dining on the food pyramid's recommended daily servings of grains, vegetables, fruits, and beans?

- A minority of the over 250,000 species of plants are known to be injurious to humans.
- Most injurious plants are not lethal—some have obvious spines, or cause mild dermatitis upon contact, or cause nausea upon ingestion.
- Some (but not all) poisonous plants are bitter tasting or quickly cause mouth irritation, so ingestion of significant quantities is unlikely. Appreciate your tongue!
- Toxicity is affected by numerous factors, including the type of toxin, method of exposure, amount consumed, and a person’s overall health, genetics, and age.
- Humans have reduced toxicity in cultivated plants after thousands of years of selection.

How can you reduce the chances of you or your children being harmed by plants?

- Know that the majority of plant poisonings occur in children under age 6.
- Teach children not to place any plant parts (or mushrooms) into their mouths.
- Teach children to recognize harmful plants.
- Teach children not to drink water from flower vases.
- Consider removing or isolating toxic plants, especially if you have young children.
- Know the common and scientific names of plants in and around your home since correct names can aid in treating possible poisonings.
- Correctly identify plants gathered from the wild, and realize cooking may not deactivate any toxins.
- Do not consume wild mushrooms.
- Avoid inhaling smoke from burning plants.
- Know that many cultivated plants have edible and toxic parts. For example, fleshy fruits of plums and cherries are safe, but their leaves and seeds within the pits are toxic.
- Research herbal medicines and teas thoroughly since few have been evaluated for safety.

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What should you do if you suspect plant poisoning?

- “Remove any remaining plant parts from the mouth.”
- “If the victim is choking and cannot breathe, call 9-1-1.”
- Otherwise, call the California Poison Action Line.
- “If you are advised to go to an emergency room for treatment, take the plant or a part of the plant with you. Do not take a single leaf or a single berry.” (California Poison Control System)

If you have pets, see ASPCA’s websites for lists of plants and foods toxic to cats and dogs since they are not necessarily affected by the same toxins as humans. For example, chocolate and grapes are toxic to cats and dogs.

Plants provide food, medicine, building material, fiber for clothing, aesthetic enrichment . . . and poisons. The more we understand plants the more our irrational fears can be replaced by prudent caution and respect.

References:
ASPCA. Toxic and Non-Toxic Plants: http://www.aspca.org/pet-care/poison-control/plants/
The Past is Prologue at Wolfskill

Wolfskill Experimental Orchards may be one of the best kept secrets in Yolo County. One Web site describes it as “a virtual Noah’s Ark of common & uncommon fruits & nuts, for example, 274 varieties of figs, 150 of pomegranates, etc.” (http://festivaloffruit.org/tours/wolfskill.html). It deserves our attention both for its place in the earliest European settlements of the region and for its vital and continuing role in preserving horticultural resources for the Nation.

THE PAST: J.R. Wolfskill came to the area by way of the Santa Fe Trail and Los Angeles. In 1838, he was able to qualify for a land grant from the Mexican government (his brother was a naturalized Mexican by marriage). J.R. Wolfskill developed the 17,754 acres of the Rancho Rio de los Putos grant, which ran along both the Solano and Yolo County sides of what is now Putah Creek.

THE PRESENT: After generations of the Wolfskill family farming and subdividing the original land grant, in 1936 one of the Wolfskill descendants (Frances Wolfskill) willed a portion of the remaining property to UC Davis to create an experimental farm that would include olive trees planted by her father. The university tract became known as the Wolfskill Experimental Orchards and is currently used by the UCD Department of Plant Sciences (formerly Pomology).

This erstwhile reporter’s limited search (Google and asking other Master Gardeners) came up “fruitless” until I pursued the thread that the Experimental Farm is now a part of the US Department of Agriculture’s National Clonal Germplasm Repository system. You can view and learn more about this by going to the site: http://www.ars-grin.gov/npgs/.

The Wolfskill Experimental Orchards is just one of 32 locations nationwide of the U.S. National Plant Germplasm System. This organization received a sharp increase in funding from the U.S. Department of Agriculture after a fungal disease nearly destroyed the nation’s corn crop in 1970. Botanists managed to stop that plague by reverting to sturdier corn hybrids that most farmers had long since abandoned, but the event served as a heavy warning of what might easily happen in the absence of a ready supply of genetic material for use in crossbreeding. (http://www.newsreview.com/sacramento/content?oid=223091)

THE FUTURE: As a part of the Germplasm Repository, Wolfskill will play an even greater role in protecting the diversity of critical food resources. It is a living library with the specific purpose of collecting, preserving, and distributing cuttings and seeds for research in developing varieties and studying plant pests and diseases. This will ensure that crop diversity is available for future generations.

You may be one of those lucky enough, as I was last fall, to attend a tasting sponsored by the Yolo County Master Gardeners, the California Rare Fruit Growers, or some other group. The tasting of pomegranate (ranging from pale yellow to dark red, sweet to tart, seedy to almost seedless) and persimmon included many varieties not seen in most grocery stores. Following the tasting and workshop, participants could harvest fruit, and many came prepared to do just that. My sister and I got a free field-based lesson on the traditional Japanese delicacy hoshigaki (dried persimmons).

This August, Wolfskill was the site for two sold-out events of interest to fruit growers. One, sponsored by the UC Davis Center for Urban Horticulture, combined a workshop with fruit tastings, a tour of the Orchard, and a pomegranate plant for each participant. Another popular event, open only to members of the California Rare Fruit Growers (CRFG), was the Festival of Fruit, which focused on the extensive variety of olives at the Orchard. CRFG has web sites with more information: http://festivaloffruit.org/tours/wolfskill.html and http://crfg.org/.

Photo by Willa Pettygrove
Central Park Gardens and its vegetable garden began as part of the playground for the old Central Davis School that was closed in the early 1950’s. It then became known as the “Arden Mayfair” parking lot. A citywide referendum conducted in 1986 gave approval for the expansion of Central Park eliminating Fourth Street as a cross street. Part of the overall design was a public garden on the west side of the park that was originally laid out in 1991. In 2006 a Steering Committee was established and a Memorandum of Understanding signed with the City of Davis to undertake the refurbishment of the public garden. The focus of the reinvigoration of Central Park Gardens has been to use water-wise, seasonal and Yolo County appropriate plantings. This approach has been the backbone of the vegetable garden development.

To demonstrate water-wise techniques we installed drip irrigation for each of the four vegetable beds. This deep soaking when watering, encourages strong, deep root growth that helps the vegetables withstand our hot summers. We add compost each year to increase the humus content, improving both the fertility and the water holding capacity of the soil. We also add a fresh mulch layer each spring to keep the vegetable roots cool and to reduce surface water evaporation.

We began our pest control with “mechanical” means such as hand picking of tomato hornworms or cabbage moth caterpillars. If the infestation is beyond hand picking we use the recommended techniques of the UC Davis IPM website. Our goal is to reduce as much as possible the application of pesticides, fungicides or insecticides. There are a few “pests” present such as whitefly and aphids but not enough to severely reduce the productivity of the garden. The reasoning for allowing a certain level of aphids is that the beneficial insects such as lady beetles generally manage to hold the aphid population in check. Using an insecticide to eradicate the aphids would mean that the lady beetles would no longer have a food source in the vegetable garden area and would move off to other areas where aphids are present. With no beneficial lady beetle predators in the vegetable area the aphid population would soon return and be a much more significant problem so we tolerate a certain level of “pes” as a food source to attract our beneficial insects.

As part of our ongoing focus on public education we have conduct regular monthly classes and teach a variety of topics, e.g. soil preparation, drip irrigation techniques and appropriate seasonal vegetable plantings. We are increasing the signage in the garden beds and with the addition of the new permanent kiosk we will be displaying “what’s new in the garden” information to indicate the changes and demonstrations in the garden. As the garden has matured we have rotated the beds through the seasonal plantings to produce a year round supply of vegetables. All produce is donated to the Community Meals program. We have recently installed a soil solarization demonstration for weed management and will be demonstrating green manure plantings for soil improvement in the fall and winter.

Future plans include developing an area to show adaptive gardening techniques and container gardening. We will also develop a compost demonstration area this fall that will allow the recycling of spent plant material thus reducing the need for the City of Davis to remove our garden debris by truck. We also plan to add a simple weather station to include an easily readable maximum/minimum thermometer near the vegetable garden. Seasonally the vegetable garden will demonstrate crops that grow well in our area as well as techniques for solving typical problems encountered by the home gardener.
The arrival of fall brings cooler temperatures ideal for planting roses in your garden. Cooler temperatures help establish plants by facilitating strong root growth. The best time to plant roses is in the early morning when temperatures are lower and roots will not be stressed from heat.

Location of the planting site is important so roses will not compete with other plants for food and water. Roses need at least six hours of sun to grow vigorously, so selecting a sunny location is very important. Roses in diminished light will show spindly growth and weak canes.

Choose a planting area where roses will not be closely surrounded by hedges, walls or other large plants. When planting roses near a fence or building place the planting hole at least eighteen inches from the structure to allow room for growth and air movement. For easy care plant roses two to three feet from access paths so you can easily reach into the bed. Keep roses at least three feet away from the base of other large shrubs. Avoid planting near the roots of trees, which will compete with nutrients. On a hillside make sure to terrace the slope with stones, bricks or landscape timbers to ensure that each plant will receive enough water. Avoid areas where windy conditions dry out roses and tear flowers and foliage as well as places where water collects and soil is soggy.

Preparing the planting hole is important in getting your roses off to a good start. The planting hole should be dug two feet in diameter and organic amendments added, such as compost, well rotted manure (preferable chicken, horse, rabbit or sheep), peat moss, leaf mold, bone meal, or alfalfa pellets. Fresh manure must be avoided as it will burn the roots. After planting, roses need adequate water for roots to develop.

When planting bare-root roses, soak them in a bucket of water for six to twenty four hours. Cut off any broken roots with a pruning shear. Place the plant on a cone of soil in the planting hole, positioning it so that the bud union or the crown is two inches above soil level. Spread out the roots over the cone of soil and gently add the remaining dirt to the hole. Tamp the soil gently around the roots to remove air pockets but do not overcompress the earth.

Planting roses in raised beds is a great solution to poor soil or drainage. Elevating your roses above the surrounding soil allows water to drain out along the bottom of the bed. Use brick, wood, or stone to construct planting beds about eighteen to twenty-four inches above ground level. Rosebushes raised off the ground are easier to reach for pruning, watering, and other garden chores.

Planting roses in containers is a great way to make the most of garden space. Containers can be excellent focal points in your garden, such as along a path or even within a large perennial bed. For large rose bushes a container in the fifteen to twenty gallon range will provide roots adequate space. Containers for miniature roses should be at least five to seven gallon size and a minimum of twelve inches across and deep. Make sure your container has a drain hole. Avoid placing the container on hot asphalt or concrete.

Plastic pots are light and inexpensive, and retain water well. Choose light colors in plastic pots to reflect heat and help protect roots from burning. Terra-cotta and wood pots are porous and allow water to pass through. This evaporation will help keep roots cool, but plants may need more watering. Avoid metal containers as these can create too much heat around the roots. Use an all-purpose premium soil mix available in bags at garden centers. When planting first place 2 inches of peat moss in the bottom of the container and around the walls. Peat moss absorbs many times its weight in water and keeps the soil mixture from drying out.

The following rose nurseries offer a great selection of roses for fall planting:

* Vintage Gardens, (www.vintagegardens.com), Garden Valley Ranch (www.gardenvalley.com),
* Rose Acres, 6641 Crystal Blvd., El Dorado, CA 95623 (530) 626-1722,
* Mendocino Heirloom Roses, (www.heritageroses.com)
For your enjoyment, and in the spirit of the classic English mystery tale, we present two brief scenes below, and ask you: “What do they have in common?”

The Case of the Guardian Oak

“Nigel!” Samantha called. “Nigel! What was that heavy noise?”

Nigel stirred and awoke. “What is it my dear? Why are you awake?”

“There was a heavy sound that woke me. It sounded like a trunk going thunk in the night!”

“Oh, sweet Samantha, don’t worry. I......” Nigel suddenly stopped, staring fixedly at the moonlight shining onto the wall of their bed chamber.

“Samantha!”

“Nigel!”

“Moonlight!” they cried out together, and rushed to the window. The guardian oak of the Smythe family, 400 years old and more, that had shielded the west wing of the house from storms as well as moonlight, lay broken on the terrace outside their window, its long branches trailing into the new lily pond at the end of the terrace.

“Oh Nigel,” whispered Samantha, “Do you remember last summer when we sat on the edge of the pond the day it was finished and saw the reflection of the oak, leaning out as if it were reaching up to catch the moon? And now....” She stopped, aghast when she saw Nigel’s face. It was drained of all color and he looked as though he might faint straight away onto the floor. “Nigel! What is the matter?”

“Samantha -- you must have courage-- the legend is that as long as the guardian oak stood, the family fortune would be safe. Now...now...” His voice trailed into a dismal sigh.

“Nigel -- you never told me!!

“No, my dear, I never thought there was any risk of harm ever coming to the oak -- it stood so stolidly here in my boyhood, and my father’s, and my grandfather’s...” He walked heavily over to his velvet-upholstered wing chair and settled down, slumped over with his head in his hands.”

“Oh Nigel”, whispered Samantha. “Dear Nigel -- don’t worry. It’s almost morning and I’m sure things will look brighter then.”

The Missing Mallory Pear Chutney

It was the best of British spring mornings on the Mallory estate -- a general flush of new growth spread over the gardens, and the sounds of birds of all sorts came from the trees, the brook, and the hedgerows. Lady Mallory stood over the galvanized steel work table in the flower pantry, carefully arranging spring blooms for display in the East Parlor. Her cousins from Edinburgh were arriving for a week’s stay that afternoon, and she wanted to present her home at its most welcoming.

“Lady Mallory.” A deep voice interrupted her thoughts. The speaker seemed to scarcely be able to control a tone (continued on page 13)
“Oh, Henning, good morning. What is it?” she replied. “It’s unusual for me to see you here so early in the morning. Most often at this time of day you’re out in the far orchards.”

“Lady Mallory, that is why I have come to speak with you” replied Henning, the Mallory estate head gardener. “The pear trees have set no fruit this year. You remember last year one tree was barren, and this year it is all!!”

Lady Mallory paused in her activities, and looked questioningly at the old man, who had managed the estate gardens for more than sixty years. She had never known him to sound upset. “You sound distressed, more than I would expect. The plums, we have good plums coming, do we not? We can do without the pears this year -- it must be the weather, that odd spell a bit back.”

“But Madam,” replied Henning, “It is the pears.” Lady Mallory was perplexed. Henning’s reaction seemed extreme, and she wondered if he was getting a bit old for the job. Perhaps she would encourage him to take a few weeks off, send him to the shore for a seaside excursion. “Madam,” continued Henning, “the pears. And this is the year 2009. The chutney year.”

A shock went through Lady Henning, and she nearly dropped the cut glass vase she was holding. “The chutney year!” she exclaimed. “What are we to do if we can’t provide Mallory pear chutney to the Queen? Without our ceremonial lease payment of ten jars of pear chutney from the Mallory pear trees, will we be able to retain our leasehold on the hunting park? Oh, Henning, this is nearly more than I can bear!” and she rushed out into the garden, gasping and distraught.

Henning followed after her, muttering to himself “The pears, who would have ever thought they could ever fail to set! The pears.......”

What do these two horticultural disasters have in common? Both might have been avoided by calling the Yolo County Master Gardener Hot Line for information when issues with the trees were first noticed. Master Gardeners use their knowledge and sleuthing skills to help amateur gardeners with their green space. The oak in the first story was seen leaning after a lily pond was installed nearby. In the second story, one pear tree failed to set fruit the year before they all failed. In both cases, access to appropriate resources might have prevented disaster!

A few questions received by Master Gardeners regarding trees have been: How do I transplant a Palm Tree? Can I grow this tree from North Carolina and, by the way, what is it? Can you suggest a tree for a 2 ½ foot space? How do I increase fig production? My peaches have no flavor. Why? My Orange tree won’t bloom! Why is a walnut tree grafted? My Sycamore has scale anthracnose. Can that cause respiratory problems in humans?

We can also answer your questions about your lawn and irrigation concerns, vegetable gardening, nasty weeds and pests, composting to amend the soil so your gardens are beautiful, and much more. These are sometimes difficult problems to solve, but with our diagnostic skills and deep knowledge of plants and trees, the sleuthing becomes a fun part of our day. As Master Gardeners we gather information, define the problem, suggest solutions and love our service to the community. Please call a Master Gardener soon to get your gardening questions answered! http://ceyolo.ucdavis.edu/Gardening_and_Master_Gardening/ or Master Gardener Hotline at 530-666-8737.
Shorter and cooler days mark the changing of the seasons. Summer is giving a last push for the fall harvest. Golden hued foliage and maturing fruit and vegetables signal to the gardener that now is the time for harvesting, cleaning and preparing your garden for fall and winter plants.

**Fall Cleanup**

* Remove fallen fruits, vegetables, leaves, spent flowers and weeds.
* Pinch back plants to allow tomatoes, melons, squash time to mature before frost sets in.
* Remove unproductive plants.
* Take down pea trellises, beanpoles, and tomato supports
* Clean gardens supports and stakes with a diluted solution of bleach before storing them for future use.
* Pick tomatoes when daytime temperatures not longer rise above 65°F. Wrap them in newspaper and let them ripen indoors.

* Maintain your compost pile by adding clean garden waste and leaves.
* Control earwigs, snails and slugs.
* Apply liquid copper to citrus to prevent brown rot.
* Apply the first dormant spray to fruit trees and in November.
* Apply liquid copper to nectarines, peaches, and apricots in November and follow up with an application in December and February.

**Feed and Amend**

* Feed and amend your garden soil. Add manure and compost to improve soil structure and fertility.
* Apply a layer of leaves, straw, or newspaper to your soil surface to reduce weeds next spring and improve soil structure.
* Amend your soil and add a complete fertilizer if you plant winter crops, flowers, bulbs or seeds.
* Apply a final application of fertilizer to citrus plants.

**Lawn care**

* Renovate a poorly performing lawn by de-thatching, aerating, fertilizing, and over seeding it with either an annual or perennial rye or fescue mix to keep it green through the winter.
* Feed lawns in early fall with a pre-emergent and a complete fertilizer (one that contains nitrogen, phosphorus, and potassium).
* Feed in late fall with a slow-release complete fertilizer, such as one labeled “winterizer”.
* Adjust the watering cycle on your lawn. It will require less water in the fall and little or none in the winter.
* Continue to mow weekly and check your sprinkler system. Be sure it is properly adjusted and that all the nozzles are working.
* Lower the height of your mower blade.
* Remove dead leaves from your lawn regularly to prevent your lawn from expiring from lack of sunlight or contracting fungus infections.

(continued on page 15)
Fall is the best time to put in a new lawn with either seed or sod.

**Annuals and Perennials**

* Continue deadheading and removing unsightly leaves.
* Divide and transplant bulbs, tubers, and corms.
* If your oriental poppies, bearded iris, peonies, agapanthus, and daylilies are becoming less vigorous and unattractive, fall is the season to divide and replant them.
* Share extra bulbs, corms and tubers with a friend.
* Enjoy the fall color of perennials. Wait until spring to trim or cut them back.
* Evergreen perennials should not be cut back in the fall. These include rock cress, creeping sedum, creeping phlox, and hens and chickens.
* Roses should keep producing flowers into December, but don’t fertilize after September. Deadhead as needed unless you prefer colorful rose hips to develop and provide winter interest.
* Plant fall flowers, such as calendulas, chrysanthemums, bachelor buttons, dianthus, forget-me-knots, sweet peas, primroses, and violas. Many of these will over-winter and provide lush color in the spring.
* Spring blooming perennials, such as foxglove, columbine, salvia, and daylilies can be planted now. Combine these with daffodils, freesias, tulips, and other spring bulbs, which should be planted no latter than the end of October.
* Fall is the best time to introduce perennials to your garden.
* Plant winter vegetables, such as broccoli, lettuce, endive, parsley, garlic and onion sets now.
* Take cuttings of your favorite annuals. Favorites are geraniums, coleus, begioias, and impatiens. Gradually move plants to shadier locations so they will adjust to the lower light levels when you move them indoors.

**Trees and Shrubs**

* Fall is the best time to plant trees and shrubs. The cooler air temperature and still warm soil provide ideal conditions for new plant roots to take hold.
* For autumn colors of red, gold or yellow, choose these trees: Chinese pistache (Pistacia chinensis), gingko (Ginkgo biloba), tupelo (Nyssa sylvatica), scarlet oak (Quercus coccinea), red oak (Quercus rubra), chanticleer pear (Pyrus calleryana “chanticleer”), or red maple (Acer rubrum).
* Plant drought tolerant trees such as valley oak (Quercus lobata), blue oak (Quercus douglasii), or a Japanese pagoda tree (Sophora japonica).
* Plant easy care and drought tolerant shrubs such as, crape myrtle (Lagerstroemia), California lilac (Ceanothus hybrids), heavenly bamboo (Nandina domestica), tobira (Pittosporum tobira), and western redbud (Cercis occidentalis).
* Deep water trees as they enter dormancy.
* Prune and shape trees in late fall.

**Garden Keeping**

* Sharpen spades, loppers, pruners, and your lawn mower blade. You can use a file or take your tools to a professional sharpener.
* Take your lawn mower to a professional for an annual tune-up.
* Clean, disinfect, and oil your tools, so they will be ready for pruning roses, trees, and shrubs from late fall to early spring.
Keep birdbaths and feeders clean and full for migrating birds.  
* Check out your local farmer’s market or pumpkin patch for a colorful selection of fall decorations, including pumpkins, gourds, dried corn, and fall flowers.  
* Keep a journal. Record your watering cycle information, pruning, spraying, and planting information. Make a list of garden improvements and fun ideas.  
* Collect seeds from your garden.  
* Check out your favorite garden catalogs. It is time to think about ordering next spring’s seeds, bare root roses, and garden tools.  
* For more information on vegetables, ornamentals, fruit trees, or lawn care, visit www.ipm.ucdavis.edu

**Garden Books**

* The Gardeners Companion by the Master Gardeners of Yolo County available through the Master Gardener Office in Woodland.  
* Fallscaping: Extending your Garden Season into Autumn by Nancy Ondra, Stephanie Cohen and Stephen Cardillo  
  This is a must have reference for designing a impressive three season garden. This book has wonderful photos, illustrations and guides for a variety of garden styles. Recommended for novice or expert gardener.  
* The Gardener’s Five Year Journal by John Ashton  
* A Gardener’s Journal: Life with My Garden by Doug Oster and Jessica Walliser

**Coming Soon!!!**

**Notes on Fungicide Options**

**Copper and Sulfur**

Sulfur, copper sulfate, lime-sulfur, and Bordeaux mixture (a combination of copper sulfate and lime) have been used as fungicides for more than a century. These are all toxic to mammals, so wear protective clothing and follow the application instructions. Bordeaux mixture is both a fungicidal and bactericidal, and can be useful against diseases such as leaf spot and apple scab. It contains copper sulfate, which is acidic and lime, which is alkaline and helps neutralize the acidic salt. Sulfur can be used as a preventive fungicide against apple scab, brown rot powdery mildew, rose black spot, rusts, and other diseases. It can be applied as a dry powder or a liquid spray. It is acidic and proper precautions should be observed.
Salts and Oils

Baking soda (sodium bicarbonate) is non-toxic, readily available and very inexpensive. It can be effective against powdery mildew and somewhat helpful against black spot. It is alkaline and if used repeatedly will eventually reach the soil below, where it can accumulate and lead to slow plant growth and chlorosis. It is best to combine baking soda with oil or soap to help it adhere and spread evenly on the plant parts.

Petroleum-based horticultural oils (mineral oils), essential plant oils, neem oil, vegetable seed oils and fatty acids are effective in eliminating insect pests and controlling pathogenic fungi. Rotation of oils minimizes the possibility of environmental accumulation. Petroleum is the most persistent vegetable oil and neem oil is the most biodegradable. Petroleum or dormant oils are best used in the spring while plants and trees are still dormant. These oils are effective in helping to eliminate over-wintering pests and diseases.

Cooking and salad oils are readily available and less disruptive to the environment. Cottonseed, olive, canola, peanut, and safflower oil are somewhat effective in controlling fungal diseases, but some find the greasy film residue objectionable.

Neem oil is derived from the extract of neem seeds and was first used as an insecticide. Recently, fungicides made with neem oil have become available and they have better fungicidal properties than the vegetable oils. It is believed that the sulfur compounds in neem have fungicidal properties. A neem oil formulation, called Trilogy has been approved by the EPA for use on food, while Rose Defense and Triact (for control of powdery mildew, rust, black spot, Botrytis, downy mildew and other common diseases) are formulated for use on ornamentals. Be sure to read the label when buying a neem oil product to determine its formulation and use.

Soaps

Soaps have been used for many years, particularly as insecticides. Commercial formulations now include soap solutions with fungicidal properties, which help control powdery mildew, black spot, canker, leaf spot, and rust. When applying any of these formulations keep in mind that improper application can burn plant tissue and stunt plant growth, if allowed to build up in the soil. It is best to apply fungicide early in the day and at one week or longer intervals.

Combine and mix the suggested ingredients. Apply with a pump sprayer. Test on a small portion of the plant to be treated. Wait 24 hours. Proceed with spray program once you have made certain that your fungicide is not toxic to the plant! Remember you are trying to control the fungus.

It is important to monitor and control diseases in your garden. If they are not dealt with now, they will re-emerge in the spring and re-infect your new plant growth. Your spring garden will be much healthier if you identify and treat your plant diseases during the fall and winter months.

For more information on identifying and controlling specific plant diseases, visit http://www.ipm.ucdavis.edu You will find helpful information for diseases under Pest Notes.