What the Platyhelminthes is This!

This could have been an exclamation from Mr. Thiselton Dyer when, in 1878, a gardener at Kew Royal Botanic Gardens outside London brought him a specimen of what became known as Bipalium kewense. Where did this specimen originate, and how did it reach Kew Gardens? Even more, how did a specimen of this non-native flatworm (planaria) appear in Davis in September 2009?

A Historical Note

Sea exploration of the world and the establishment of colonies in distant countries was the driving force for many European cultures for more than 400 years. Colonies provided items such as silk, spices, tobacco, potatoes, and sugar, all of which became essential to the Europeans. Many of these ships’ crews included a botanist/scientist. One of these botanist/scientists, Sir Joseph Banks, accompanied Captain James Cook on the voyage of The Endeavor (1768-1771) bringing back thousands of samples never before seen or scientifically catalogued. Before the voyage of the Endeavor, Kew gardens had a catalogue of 600 specimens. With the addition of Banks’ discoveries, the catalogue grew to 11,000 specimens during his directorship of Kew Gardens (1772-1820). With no established quarantine systems in place, many of these specimens brought to Kew Gardens carried along with them “hitchhikers”, and Bipalium kewense is presumed to have been one of these.

World Distribution

The natural habitat and environment of Bipalium kewense and most land planarians (flatworms) is tropical and sub-tropical with high temperatures and high humidity. Their native range is believed to include an area from Vietnam to Kampuchea, Cambodia, and also possibly into Malaysia. The most common mechanism for the spread of this tropical planaria is by the horticultural, greenhouse, and garden nursery practice of moving potted plants from one place to another. Once established in a greenhouse, there is the possibility of the planaria moving out into...
the natural habitat. Specimens have been found in England, Scotland, Australia, the Caribbean, South and Central America, the Far East, and South Africa. In the USA specimens have been found in the natural habitat of Florida, Louisiana, Georgia, Texas, North and South Carolina, and southern California. They have been found in greenhouses in eight eastern states, two southern states, and California.

In April 2006 and March 2008 specimens were found in the San Francisco Bay areas of Richmond and Novato. My daughter, in September 2009, moved plants from her garden in San Francisco to her home here in Davis, and our specimen of *Bipalium kewense* was found attached to a soaker hose in a Davis garden.

**Habitat**

In their native environment, most land planarians avoid sunlight during the day. High humidity is essential for survival so they prefer cool, dark, moist areas and are mostly found under rocks, logs, shrubs, and decaying biological material. Some land planarians are found in caves. Rural sightings are rare. Land planarians are most active at night while feeding. They are most plentiful in fall and spring and can be found on the soil surface following heavy rain.

**Description**

Planarians do not have a respiratory or circulatory system, skeleton, or anus. The mouth (attached to a three branched intestine) is found near the middle of the body on the underside. An extendable muscular pharynx is used as a feeding organ. The mouth also functions as the anus for the primitive excretory system. A cluster of nerves (ganglion) at the head end functions as a “brain” and is connected to ladder-like nervous system. Movement is through a system of circular and longitudinal muscles, and as they move they wave their heads from side to side. Planarians, when in motion, excrete a large amount of mucus from glands in the body wall. Movement over this mucus bed is aided by fine white cilia (hairs) found in a strip on the underside of the body. Planarians can lower themselves to the ground from plants or pots by means of a string of this slimy mucus.

**Reproduction**

Reproduction most commonly is by the separation of a 1 cm piece of the posterior end of the planaria. This end segment is slowly “pinched off” by a narrowing of the body wall. The segment becomes attached to the substrate of soil, plant, or debris and separates as the parent moves away. It can move immediately and forms a head within 7-10 days. Planaria usually release 1-2 fragments each month. Each worm has both male and female organs can also reproduce sexually by copulation. There are only two observations recorded of the release of a fertile, bright red egg capsule of Biplaidum kewense. An egg capsule that was observed in Texas (June 2006) hatched in 21 days and produced 7 juveniles.

**Feeding and Diet**

Land planarians including *Bipalidum kewense* are carnivorous. The waving motion of the head allows the planaria to utilize the chemical receptors in a pit on the underneath surface of the fan-shaped head. Following chemical cues, the prey is then held tightly to the surface and covered with the planaria’s slimy mucus secretions. The extendable mouth reduces the prey to small particles that can be stored inside the body in small food cavities. Planaria can survive for many weeks without feeding and will shrink in size as they use the stored food.

**Friend or Foe**

*Bipalidum kewense* has few enemies and is rarely eaten by other animals. Planaria are carnivorous and will devour each other. The mucus secretions seem to be distasteful to other animals but not toxic. As *Bipalidum kewense*
has jumped around the world and moved into the natural environment, it has decimated the native earthworm populations in some regions. For example, in the southern United States, particularly in Florida, *Bipalium kewense* has significantly affected earthworm farm beds.

*Bipalium kewense* has not spread in the USA at a rapid rate, but it is believed that now it has established a foothold in natural environments in the southern Atlantic states. Greenhouse specimens have been found as far north as Massachusetts where it may survive cold winters if it has enough protection. California has had regular, annual reported incidences of gardeners, horticulturists, and nursery workers finding specimens of *Bipalium kewense*. In California this unusual worm is most commonly found in the soil of pot plants. If you do find a specimen of *Bipalium kewense* check the surrounding environment for any other other specimens and remove them to prevent an escalating infestation.

**References**

2. Florida Department of Agriculture & Consumer Services, Division of Plant Industry, Nematology Circular No. 75, May 1981
5. Royal Botanic Gardens - [http://www.kew.org](http://www.kew.org)

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**Extraterrestrial Gardening**

Plants have been part of experiments in space since 1960 when millions of tomato seeds were exposed to the vacuum and radiation of space for 5 ½ years aboard the USSR Sputnik 4 satellite. Most of the tomatoes grown from these seeds had normal taste and growth patterns. In the 1990s, plant experiments began again aboard space shuttle flights with exposure to microgravity. More recently, experiments have centered on growth aboard the International Space Center (ISC), a joint effort by the U.S., Russia, Canada, and European Union. As astronauts spend longer amounts of time in space in the ISC, scientists study whether plants can be used to make their stay easier.

Humans and plants are ideal traveling companions. Humans consume oxygen and release carbon dioxide. Plants return the favor by consuming carbon dioxide and releasing oxygen. Humans can use edible parts of plants for nourishment, while human waste and inedible plant matter can be broken down by microbes to provide nourishment for plant growth. Plants and microbes can also be used to purify water with the help of machines. The only input needed to keep such a system going is energy in the form of light.

Currently, research is being conducted at the Kennedy and Johnson Space Centers on building a bioregenerative life support system that will be fully self-contained and weld people, plants, microbes, and machines to a miniature ecosystem capable of supporting space travelers indefinitely. Their goal is to have plants and people living together in a balanced, sustainable habitat where contact with Earth is a luxury and not a necessity. Using biotechnology and nanotechnology methods, plant genes can be altered so that their cells produce molecular sensors that monitor...
plants internally, report on their health, and control their sprouting and flowering. Plants can also be engineered to produce chemicals for protection from increased radiation in space and on planets with thin atmospheres, such as Mars, and light can be delivered directly to the cell parts that perform photosynthesis, making the plants more efficient.

But what are the right plants for a space garden? Scientists say they should have short stalks to save room, contain few inedible parts, grow well in low light and be resistant to microbial diseases. Astronauts have successfully grown soybeans, potatoes, tomatoes, wheat, and peas in space, while rice, lettuce, peppers, strawberries, onions, and herbs are being used in research experiments on Earth in conditions that mimic those in space. Because room for plants is limited, dwarf varieties of crops that grow only to a foot in height are best. In order to grow these plants, soil granules must be the right size—too big so they won’t get enough water and too small so they won’t get enough air. One to two millimeters appears to be just right. On Earth, the graininess of the soil isn’t very important because water percolates downward due to the pull of gravity—a process that aerates the soil around a plant’s roots. In a free-fall environment, there is no downward percolation and less natural air circulation so fans are used to provide air movement. Hydroponics, growing plants in nutrient solutions without water and soil, is also being tested.

NASA has many examples of plant growth experiments in space that can be done by students from Kindergarten to 12th grade (see www.nasa.gov). Master Gardeners can help conduct these investigations. For, who knows, someday Master Gardeners may be gardening in space, and so may you.

Renew, Rejuvenate, and Rejoice
Winter Rose Care and Selection

Linda Parsons, Yolo County Master Gardener

This is a wonderful time to reflect, plan and anticipate the rejuvenation and renewal of your rose garden. Walk through your garden and take notes on how you would like to improve it in the coming year. How will you promote a beautiful, healthy, water-wise, and environmentally friendly garden?

An important part of annual rose care is proper pruning and cleaning. Begin your pruning in late December and try to finish by mid-February. Prune all roses, except those that bloom once a year. One time bloomers should be pruned after they bloom and then lightly through the year to keep roses free of dead, injured, or crossing canes.

The purpose of pruning roses is to remove non-productive, injured, diseased or crossing canes. Pruning promotes new, healthy and more productive growth. Pruning inside the rose bush helps create a nice vase shape and reduce disease by increasing airflow.

Remove all rose foliage from pruned roses and clean up the rose beds of all debris, especially rose leaves and blossoms. This will reduce or eliminate fungal diseases and over-wintering insects. Discard all rose clippings. They should never be placed in a compost pile.

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Winter 2009

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Spray with a dormant oil to prevent the over-wintering of diseases and pests. You can add a copper or lime sulfur spray to the dormant oil, if you routinely encounter fungal diseases in your rose garden. In mid-February stop all dormant oil spraying, as these sprays will burn the tender growth. If necessary, you can continue to use a general-purpose fungicides, but spray early in the day and read the directions carefully before spraying.

By mid-February your roses will begin to put out new growth. Continue to keep a close eye out for fungal disease. Look carefully at the lower branches and under the leaves for the first signs of rust and mildew. It is easier to control fungal diseases if you attend to them early. If you see the disease on the tops of your roses, you can be sure that your roses are very diseased and it will be more difficult to control or eliminate the problem.

Apply a new layer of mulch in your rose garden. Mulch is essential in reducing water use, keeping rose feeder roots protected, and improving soil quality. Be sure your garden is clean and free of disease carrying debris before applying mulch. Cut back groundcover, herbaceous perennials, and edging plants that are around your roses. Remove fall leaves.

Monitor for insects as the weather warms. Aphids will be your most likely visitors, but thrips and mites may follow. A strong blast of water from your garden hose is your first line of defense.

Plan fertilizer applications from mid-February until late September. An easy rule of thumb is to fertilize after each bloom cycle. This is usually about every 6 weeks. I prefer organic rose fertilizers with micronutrients. Rose are hungry and thirsty during their productive months, so for optimum blooms and good health, feed and water them consistently through the seasons.

Check and repair your watering system. Consider installing a drip irrigation system if you do not have one in your garden.

Transplant, remove and replace any of your roses by mid-February. If a rose has not been productive or healthy, it is best to replace it with a newer or more suitable variety. Learn about roses that are easy care or especially bred for the conditions in your garden.

Rose catalogs will soon be in the mail and your local nursery will have this season’s new selections as well as rosarian favorites in December.

As I can’t wait until winter, I begin looking for new roses on rose websites in the early fall. I have already familiarized myself with the newest roses and the All-American Rose Society winner for 2010.

This year’s AARS winner is ‘Easy Does It’. This is a gorgeous floribunda with showy, ruffled petals of mango, peachy pink and apricot. In keeping with AARS winners, it is disease resistant and easy to maintain. To view the latest rose releases for 2010 visit the following websites.

Regan Nurseryz: http://www.regannursery.com/
Jackson Perkins: www.jacksonandperkins.com/
David Austin Roses: http://davidaustinroses.com/

If you are interested in selecting roses for specific garden requirements or you want to find classic and award winning roses visit the following websites.

World Federation of Rose Societies: worldrose.org
All-American Rose Society: http://www.rose.org/
American Rose Society: http://www.ars.org/
Sacramento Rose Society: http://sactorose.org/

Think ahead to the warmer weather and imagine your garden. Caring for your roses this winter will ensure beauty and joy throughout the coming year.

For further information on rose and garden care visit http://ipm.ucdavis.edu/, or attend the Basic Rose Care and Pruning Class that will be offered at the Davis Central Park Garden on January 9, 2010.
Merle Clarke, Yolo County Master Gardener

Community Gardening

If your community is lucky enough to have a community garden and you have no space of your own, or your home garden is too full or too shady, or you need more space than you already have, you might want to consider getting a plot. Price for a space is generally cheap. The plots are usually big enough and normally have ample water supplies. If the gardens have been there awhile, the soil is usually reasonably good from previous tenants. If not, a good gardener can always make it better. Before taking the plunge, however, the pros and cons of taking a space should be considered carefully.

There are some downsides of gardening out there in the urban jungle, but the positives surely outweigh the negatives. The best part of having a place in a community garden plot may just be your fellow gardeners. The identity “gardener” itself denotes a fellow traveler. Like you, they just want get outside on a nice or not-so-nice day and put their hands in the earth and grow something, be it flowers, food, or herbs. There are no political agendas in the soil on a good garden day. All kinds of people garden. Most of them are out there for the same reason you are. The subject is gardening, not politics, education, or income level. You can extend your social circle if you wish. Gardeners come in all ages, shapes, and sizes.

You can see a productive and beautiful garden and meet the gardener who made this happen. You can learn new gardening techniques and exchange information. You can trade seeds and plants that may not be commercially available. On a nice spring day, go out to your garden, inhale, talk to your friends there, and enjoy what all of you have made.

There are a few caveats. You will have neighbors. As in all neighborhoods, some of the inhabitants are easier to work around than others. Going green is good these days. Many enthusiastic people will take up a community plot without first considering what it entails. The work is hard and takes a lot of time. (This is true of all gardens, public or private.) Therefore, your next-door neighbor can plant his garden and then let it go. The result is that next door you might find an overgrown, ugly, weedy plot with pests that have gratuitously spilled over on your side. Every garden needs sun, but the hops or pole beans planted next to you may block your light, or wild watering by a neighbor might impinge upon your own carefully devised watering system. These problems are usually minor and can be solved with a little ingenuity and diplomacy.

Because your garden is out there on public land, now and then the public helps itself to your veggies or flowers. Occasionally somebody might party in your space. One day you might come out to see your plot and find beer cans and footprints in your seedlings, the fences and structures you paid for with time and money down and damaged. It can break your heart, but only if you let it.

However, if you really want a garden space and this is the only way you can, gardening in public can satisfy you. Enjoy your own efforts and those who garden nearby. If you are a gardener, doing it out there in the community levels the playing field. Community gardening is a great equalizer. It gives all members of your town or community an equal share in the planet we all come from, depend on, and have the right to play in.

Expand your horizons. If your own community does not have a public garden, talk to your town government. Great experiments always take place out there in the open.
The Appeal of Rock Gardens

Rock gardens became popular in North America in the 1920s, although its popularity lessened during the depression. After the Second World War, interest in rock gardens surged, particularly in the Pacific Northwest, where renewed interest was aroused in part by exposure to Japanese gardens. The founding of the American Rock Garden Garden Society in 1934 also advanced support and enthusiasm for rock gardens. Once again in vogue, rock gardens are well suited to small properties and the busy pace of modern life. In a very small space, the gardener can have a wide range of plants that can be easily tended and are water wise.

Site Selection

Rock gardens are often developed on a bank or slope to solve problems, such as improving drainage, holding the soil and eliminating the need to mow. In planning, the gardener must take into account the garden areas already present or planned, the architecture of the house, and whether there are outcrops that can be utilized. In general, an informal or natural rock garden is appropriate to an area some distance from the house, while a more formal garden works better in association with the house.

Choosing Rocks

A few fortunate gardeners will have an authentic rock feature with which to begin. If there is not an existing outcrop or clump of boulders, the next step would be to choose some interesting rocks. Commonly used rocks include granite, basalt, gneiss, sandstone, limestone, tufa, shale and schist. For the informal garden, use only one kind of rock and local rock if it is suitable. Rocks are available from several places. The best rocks for the environment are those gathered from the garden site itself. Local quarries, building sites and garden centers are additional sources. When purchasing rocks, look at them carefully and choose aesthetically pleasing pieces, preferably with some weathering. To assess the amount of rock needed, figure out the surface area of the garden-to-be, and for a naturalistic garden, estimate that 10 to 40 percent of the garden should be exposed rock.

Building Process

Position the rocks in the garden so that they create a natural look with consideration as to how the rock features fit into the rest of the garden and landscape. For example, a rock feature on a hillside that simulates exposed bedrock is more likely to be attractive than a pile of rocks in the middle of a lawn. However, it is possible on a level site to create the impression of a rock formation jutting up out of the ground, around which a rock garden has been constructed. Its success depends upon the skill with which the stones are placed. The rock formation should not be unnaturally high; instead, it should be low (usually under two feet) and spreading.

Whatever form the rock garden takes, it will be necessary to excavate and prepare the soil below ground level. Once the shape of the garden area is established, cut out the turf and dig up any remaining topsoil, piling it nearby for future use in the rock garden or elsewhere. Next, excavate to a depth of about a foot. If working into a slope, grade the subsoil into the terraces or contours of the garden. Lay down 4 to 8 inches of rubble or coarse stones and top with 1 or 2 inches of coarse gravel. These two layers may not be necessary if the subsoil is very coarse, sloping and naturally well drained, in which case simply adding in coarse sand or pea gravel may suffice. On this firm bed, set the rocks and infill the soil, firmly and completely, leaving no air pockets or exposed roots. It is a good idea to work from the bottom of the slope, placing each rock on its broadest base and tilting it slightly toward the slope so that rainwater will trickle inward to plant roots. Ensure that all rocks are completely stable by burying one-third to one-half of each rock in the ground.
Soil Composition

Because drainage and aeration are key to growing plants successfully, an excellent soil mixture is one that is equal parts of good garden loam, sand, gravel and either compost or peat moss. On top of this, place a mulch that is usually made from crushed stone or gravel chosen to blend with the rocks in the garden, although in some cases it is organic, e.g., crushed leaves and bark. This stone mulch is an important part of the garden. It keeps the soil cool and retains moisture, provides surface drainage, prevents mud from splashing on plants, discourages weeds, protects plants that are vulnerable to moisture collection around their stems, helps to unite the rocks with the plants and keeps the garden neat and trim.

Plant Choice

Placement of plants in a rock garden is a matter of personal taste and aesthetics; however, the design process can be made easier by doing it in an orderly fashion. First decide where to put a few crucial evergreen shrubs or conifers. They give weight, permanence and backbone to the garden and provide contrasting heights, textures and interest. Then add deciduous shrubs and low-growing perennial flowers, ferns and ornamental grasses around them. A number of clumping types of grasses, sedges and rushes look well in the rock garden, and their tufts of green and grey can be very restful. Finally add spring and fall bulbs that have long periods of dormancy and annual flowers.

Annuals can be useful in covering bare places created when bulb foliage disappears or when a plant dies, softening newly constructed areas and giving color late in the season. Annuals should have the character of rock garden plants with tidy compact growth — not full-blown border plants. Because the top of the slope is drier, the bottom provides the best habitat for plants that require more moisture.

Many high elevation alpine plants are popular in rock gardens because they can withstand harsh climates. They also have enlarged root systems, which anchor the plants and allow them to penetrate more deeply into cracks and crevices in search of scarce moisture and nutrients.

Some plants suitable for rock gardens

**Shrubs and Conifers**

* Dwarf hollies (*Ilex* spp)
* Boxwoods (*Buxus* spp)
* Daphnes (*Daphne* spp)
* Spireas (*Spiraea* spp)
* Heaths
* Heathers
* Rhododendrons
* Azaleas
* Juniper (*Juniperus*)

**Herbaceous perennials**

* yarrow (*Achillea ageratifolia*; *A. tomentosa*),
* stone-cress (*Aethionema* spp),
* Lady’s mantle (*Alchemilla alpina*),
* basket-of-gold (*Alyssum alpestre*; *A. saxatilis*),
* rock jasmine (*Androsace sarmentosa*),
* columbine (*Aquilegia* spp),
* moss pink (*Phlox subulata*),
* snow-in-summer (*Cerastium tomentosum*),
* bell flowers (*Campanula* spp),
* pinks (*Dianthus* spp),
* rock cress (*Arabis alpin*; *A. caucasia*),
* candytuft (*Iberis sempervires*),
* primroses,
* Alpines.
* Wildflowers
* Gentians

**Bulbs**

* Grape hyacinth (*Muscari botryoides*; *M. azureum*)
* Daffodils (*Narcissus* spp)
* Iris (*Iris* spp)
* Cyclamen (*Cyclamen hederifolium*; *C. europium*)
* Crocus (*Crocus* spp)
* Tulips (*Tulipa* spp)
Simple Tools That Work in the Garden

Willa Pettygrove, Yolo County Master Gardener

If you were to throw out all but your most frequently used tools, what would you keep? My handy toolkit was assembled over time from a few found objects and some inexpensive purchases at the local hardware store. It all “lives” in a dedicated bucket, ready for the garden whenever I am. Here’s what I find most useful, that may work for you too.

1. **Five gallon plastic bucket**: These can be purchased new, perhaps with a store logo, or recycled from a bakery or other commercial establishment, or square like the ones for kitty litter. Even black five gallon planters will do, if a handle isn’t needed. Have one for a tool tote, and one for collecting debris as you work. An alternative is a small plastic tool tote.

2. **Bucket caddy or handled tote**: The bucket caddy is like an apron for the five gallon bucket—all pockets. Find a cheap one: not too many pockets, and water resistant fabric to withstand accidental wetness. (If you are very talented, you may be able to sew your own caddy; see noveltyquiltfabric.com/library/MichaelMillerBucketCaddieFabric.pdf.)

3. **Zip ties**: Zip or cable ties are usually in the electrical section of the hardware store. Look for brightly colored ones about 8 inches long. A big package costs very little. You will use them to fasten wire, plant labels, vines, etc. etc. Easily cut with scissors or pruners.

4. **Duct tape**: Find a small roll in a color you like. Use the tape to label tools, mend plastic and tarps.

5. **Big cheap scissors**: Use these to cut transplant six packs, seed packets, weed cloth, plastic sheeting, bouquets, and sprigs of herbs. Save the pruners for pruning. Look for a pair with brightly colored handles. You won’t lose them so quickly.

6. **Marker pen**: Choose one that is waterproof and will write on damp surfaces.

7. **Resealable plastic bags**: These will be handy for plant starts, pest identification, and collecting for seed savers.

8. **Ordinary kitchen knife**: Small is good, and it doesn’t have to be very sharp. It will do fine for harvesting broccoli, cabbage, etc.

9. **Plant labels**: I like recycled plastic spoons that accept marker pen ink.

10. **Staple gun**: Again, small and cheap is OK. You will love this for attaching plant labels (the ones that come with your transplants) to stakes, for taming floating row cover, and many other uses.

11. **In addition** to these 10, don’t forget your bug repellant, gloves, and ear protection, if you use power equipment. Then, hum along with me: “’Tis a gift to be simple, ‘tis a gift to be free…”

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There isn’t much a gardener can do about the weather. Attempts have been made from praying for rain to building green houses. Effectiveness varies but the first thing to do is to monitor and record. The resulting information allows a gardener to work with nature and take advantage of conditions to keep the garden healthy. The gardener who can anticipate the weather and prepare for it will have more success and be able to detect and respond to problems sooner for the sake of a happier and healthier garden.

A tale of two gardeners: First, my father, the late Edwin F. Studer was a weather junkie. He read the weather page in the paper each morning, watched the Weather Channel on cable TV and monitored his gauges every few hours. He maintained a legendary vigilance on current conditions outside and always knew what the weather would bring.

Then there is a friend in West Sacramento who comes home each night after work, makes himself a Gin and Tonic and sits on the patio in his backyard. By the time he finishes his drink he can tell you what the weather will be like the next day. He can also tell you when the persimmons are ripe, when the Daphne will bloom and whether the delta breezes will blow. He is not a genius or a witchdoctor. He is observant. His ability to retain his observations over time gives him a well-educated idea of what to expect of the weather and of his garden.

The average gardener does well to find a happy balance between these two examples. There are many gadgets for monitoring the weather from thermometers to Doppler radar. This article focuses on four items—a thermometer, a barometer, a rain gauge and a garden journal—that can get you started on your weather monitoring career.

The thermometer measures heat (or the lack of heat) in the air. Thermometers come in two basic types—bulb and spring. Bulb type thermometers are filled with water, alcohol or mercury and spring type thermometers use a metal coil. The bulb type provides a more accurate reading but both types work on the same principle. As the air around the thermometer heats up, it causes the material in the thermometer to expand. The Thermometer’s scale or dial translates this expansion into degrees of temperature in Fahrenheit or Celsius. Americans use the Fahrenheit scale for weather, the rest of the world uses Celsius. The conversion \((C \times 1.8) + 32 = F\) will get you from theirs to ours.

If the temperature drops below 32 degrees F frost can occur. Frost occurs in Yolo County backyards for a few days each year and can damage or kill more sensitive plants in your garden like citrus trees or bougainvillea. It can also weaken plants that are struggling to defend themselves from other threats. An otherwise healthy Japanese maple tree may be able to hold its own against verticillium wilt until frost weakens it and it finally loses the battle. To reduce or avoid frost damage, provide a protective covering for sensitive plants whenever the temperature dips into the low 30s F during the evening. Be sure to remove the cover as the temperature rises during the day so that the plants can still enjoy some sunlight and moisture from the air. Materials exist that allow some moisture and sunlight penetration to the plants while providing protection from the frost but nothing says “fresh air” like fresh air.

The high end of the temperature scale has its own issues. Tomatoes struggle to set fruit in temperatures above 90 degrees F. Evapotranspiration rates (the combination of water evaporation into the air from the soil and transpiration from plant processes) increase significantly on hot summer days requiring adjustments in irrigation schedules. As the weather cools and more rain falls irrigation systems should be reduced or turned off to avoid problems associated with molds.

The Barometer measures air pressure—the weight of the atmosphere as it presses down on the earth. Without getting into a lot of the science, changes in air pressure as measured by a barometer foretell changes in the weather. In general, high pressure blocks storms from...
entering an area so it is associated with sunny, clear or dry weather and low pressure allows storms to come through the area so it is associated with cloudy, wet weather. Most local weather reports use the term the “Storm Door”—the “door” is closed when high pressure dominates and the “door” opens during periods of low pressure. For gardeners, it’s the change that’s important because preparing for the change is a lot better than trying to protect the garden in the midst of a downpour or a cold snap or a dry spell. Experience teaches that the middle of the downpour is not the optimum time for cleaning out the gutters and it is challenging to cover frost sensitive plants when your fingers are freezing cold.

The rain gage measures precipitation or the amount of water that falls in a given area. Information on the local news or weather reports in the paper provides a good idea of how much water has fallen at the airport. If your garden were at the airport this would be adequate for determining how much to augment the rain with your irrigation system. The problem here is that you do not live at the airport and neither do the plants in your garden. Putting a rain gauge in your backyard, monitoring it regularly (daily is best) and keeping track of how much rainfall has accumulated in your own backyard gives you the best guidance on how much to water or not water during the year to maintain a healthy moisture in the soil around your plants.

Finally, record the readings from your gauges in a garden journal. Over time this practice begins to yield a very accurate and dependable body of data upon which you can make good gardening decisions. It may also provide early warning signs for what ails your plants. To broaden your interaction with nature, include observations on visitors to your garden like various pollinators, bloom periods of flowers, bud break on dormant plants, the appearance of various birds and the setting of fruit.

If nothing else these items arm you with interesting things to add to the conversation at the next cocktail party when the discussion inevitably turns to the weather. Happy gardening!
Winter Gardening Tips

Linda Parsons, Yolo County Master Gardener

When I think of winter gardening it reminds me of preparing for company. There is so much to do! Making plans, purchasing new plants and seeds, cleaning and pruning shrubs and trees. It is a time of supreme busyness and a most anticipatory time! I can’t dally too long or my guests will be here! Yes, the sleeping trees, shrubs, bulbs, and seedlings will be popping forth before I am scarcely ready! While the days may be shorter, I have lots to do in my garden. I want to be ready for spring and the riot of color that it will bring.

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.
* Lawn mowers need a yearly tune-up and blade sharpening. Now is a good time.

WATER

* Watering can be eliminated once the rains begin. Until then, most lawns and plants do well with weekly watering. If it is very windy, the temperature drops significantly or there has been no rain in several weeks, check for signs of dehydration in your garden. Additional water may be necessary.
* Check the plants under tall evergreen and under eaves of the house to see that they have sufficient moisture.
* Check potted plants checked often. Too much water in the saucer can cause your plants or bulbs to rot.

PROTECTION

* Protect frost sensitive plants. Move potted plants to a more protected part of your garden or patio. Shelter them under the eaves of your home or place them under a table or a garden chair. This will help to minimize damage from the wind and cold.
* Cover sensitive, larger plants and small trees with sheets or burlap when the temperature approaches freezing at night. Adding strings of electric lights can also be helpful.
* Anti-transpirant sprays, such as Cloud Cover can also be used to reduce frost and freeze damage.
* Cover sensitive ground cover with layers of newsprint at night and remove in the morning.
* Plastic sheeting is not recommended to protect plants because it cannot breathe and collects moisture.

PLANT

December is the last month to plant spring blooming bulbs such as daffodil, tulip, anemone and crocus. Plant bulbs three times deeper than their greatest diameter. Use bulb fertilizer. What to plant now:

* cool season annuals: pansies, violas, snapdragons, calendulas, and Iceland poppies.
* cool season perennials: Helloborus, Daphne, and Iberis.
* annual vegetables: peas, spinach, kale, loose leaf lettuce, radish, carrot, and broccoli.

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* winter 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 pests or cold nights.
* Extend your harvest time by planting vegetables every two weeks through December.
* Late winter is the best time to plant or transplant most any garden shrub or tree. Both deciduous and evergreen shrubs can be planted or transplanted including roses. Your local nursery will be stocked with many varieties of potted and bare-root trees and plants.
* After you have discarded your summer vegetable plants, turn the soil over before it becomes too wet. This will help to disturb the over-wintering tomato worm larvae that live in your garden soil.
* Sow seeds in early February for your summer garden. Favorite selections include tomatoes, squash, eggplant, peppers, and herbs. Seedlings can be transplanted in your garden after the soil temperature reaches 50°F. Begin planting spring annuals: alstoemeria, dianthus and alyssum. Summer bulbs, such as callas, dahlias, cannas, tuberous begonias, and lilies are now available at your local nursery.

FERTILIZE
* Mid to late February is the time to fertilize trees, shrubs and evergreens. Use an acid-loving plant fertilizer to feed evergreens like junipers, conifers, broadleaf evergreens, azaleas, and camellias. Use a rose or all-purpose garden type fertilizer to feed roses, fruit and flowering trees, as well as other deciduous trees and shrubs. If you use granular fertilizer, keep it off the foliage and water it in thoroughly.
* Extra nutrients for roses can encourage healthier growth. Try using 1 ounce (2 Tbl.) of Epsom salt (MgSO4) and 8 ounces (1 cup) of plain alfalfa pellets for each plant. Sprinkle around the drip line of each rose. The Epsom salt helps improve chlorophyll production and alfalfa contains the growth stimulant triacontanol, which encourages basal breaks.

DISEASE, PEST, AND WEED PREVENTION
* Early winter is a good time to make an application of dormant oil spray on your roses, fruit and deciduous trees and shrubs. It is best to prune these before you apply this spray. Dormant oil spray helps prevent over-wintering of insects and diseases in your garden.
* Peaches and nectarines need to be sprayed with lime-sulfur or copper sulfate to prevent leaf curl and blight. An easy way to remember this schedule is to spray on or near Thanksgiving, New Year's and Valentine's Day. The spray should be applied when the temperature is above 45° F and there will be dry weather for at least twenty-four hours. Complete spraying before buds begin to open.
* Snails, slugs and earwigs need periodic checking. Handpick, bait or trap if they become a nuisance. Mulch your garden. This is the easiest way to prevent new weeds. Place several layers of newspaper under a thick layer of mulch to provide superior weed control. Remove weeds while they are small for easiest control.

PRUNING
* Roses can be pruned in late December through early February. Prune according to the type of rose (e.g. floribunda, hybrid tea, climbing, etc.)
* Deciduous fruit trees and ornamental shrubs and trees need pruning. Winter pruning stimulates more growth. Fruit trees pruned in early summer will require less winter pruning.

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**Favorite Things**

* A wonderful guide for our area is *Northern Californian Gardening: A Month-by-Month Guide* by Katherine Grace Endicott. This is a great book for someone new to N. California or new to gardening in our area. It is more of a guide and reference book--so not as visual as other garden books.
* My favorite and on my wish list book is *The Winter Garden* by Jane Sterndale-Bennett. This is a gorgeous and practical book for those of us who love to garden during the winter months. It has inspirational photos and proves that it is possible to enjoy flowers (yes flowers!) and beautiful winter color.
* *Winter Flowering Shrubs* by Michael W. Buffin is a terrific resource for the garden who is looking for appealing shrubs for winter flowers and color.

In addition, I found several fun children's books. What is more natural than introducing your love of gardening to the kids in your life? These also would make great gifts.
* *I Love Dirt* by Jennifer Ward. This is a delightful book that is more instructive and fun than the title may suggest It has wonderful activities to inspire the love and joy that nature holds. This is on my list of books for my grandkids!
* *A Child's Garden: 60 Ideas to Make Any Garden Come Alive for Children* by Molly Dannemaier If you read this book, you will surely feel like a child again-discovering nature for the first time. This book really invites you into the garden!

**Recommendations for Overcoming the Winter Doldrums**

* Get out and explore our larger backyard or learn about gardening in our area.
* One of my favorite places to visit, especially in the quiet of winter, is the Effie Yaew Nature Center in Ancil Hoffman Park. It is a peaceful sanctuary to visit and explore on your own or check out the lectures, classes and field trips that are scheduled. In addition: There is the Winter Bird Festival hosted by the city of Galt on 1/30/10. While this is not directly related to gardening, it fosters the love of nature and birds in our area.
* Learn more about local gardening and garden events: On Sunday mornings if you aren’t in the garden try listening to our local garden gurus; Farmer Fred (Fred Hoffman) hosts KFBK (1530am) Garden Show from 8:30 a.m-10:00 a.m. or Get Growing on KSTE (650 am) from 10:-noon. Bob Tanem hosts In the Garden on KSFO (560am) from 7-10:00a.m.

“All through the long winter I dream of my garden. On the first day of spring I dig my fingers deep into the soft earth. I can feel its energy and my spirits soar.” -Helen Hayes-

Perhaps one of the best New Year’s resolutions is to spend more time in the garden, especially in the winter months. The time and care we put in now will reward us with a beautiful and healthy garden through the coming seasons. How fortunate we are to have mild winters and many sunny days to enjoy the beauty of our winter gardens. Don’t miss this beautiful and peaceful time in the garden.
Choosing Mulches

Albert Crepeau, Yolo County Master Gardener

When choosing mulch, you should think about availability, affordability, appearance, and ease of maintenance for winterizing garden beds. But with so many different kinds of mulches to choose from, which one is the best for your garden as you prepare to mulch? Let’s explore the advantages and disadvantages of mulches available on the market today, and select one that is right for winterizing your garden.

Mulch encourages earthworm activity, reduces snails and slugs, helps retain warmth in soil over winter, protects soil from treading and compaction, acts as insulation, keeps weeds down, keeps soil from splashing on leaves, and, if organic, feeds the soil by adding all important humus to soil as it decomposes.

Organic mulches improve condition of the soil. As these mulches decompose, they provide organic matter which helps keep soil loose. This improves root growth, increases the infiltration of water, and also improves water-holding capacity of the soil. While inorganic mulches have their place in certain landscapes, they lack the soil improving properties of organic mulches. Inorganic mulches may be difficult to remove if you decide to change your garden plans.

Pine bark, compost, mushroom compost, stable straw, leaves, grass clippings, wood chips, wood shavings, sawdust, lava rock, rice hulls, and coffee grounds are only a few of the many choices available. Bark chips and composted bark are available at garden centers. These make a neat finish to the garden bed and will eventually improve condition of soil. Smaller chips tend to be easier to spread, especially around small plants. Hay and straw work well in the vegetable garden although they may harbor weed seeds. Ground corncobs or pine needles can also be used. Corncobs are best when chopped in smaller pieces.

Pine needles tend to increase acidity of soil so they work best around acid-loving plants such as camellias. Pine needles discourage snails and slugs from the garden. Bark is long lasting and can create a forest look in the landscape. Buying bark nuggets by the bag, as with other mulches, is often expensive. Buying in bulk can save you money. Also be aware that rainwater can wash some mulch materials away.

Inorganic mulch such as red lava rock spread over a weed barrier fabric provides a great look for an island theme garden. Red lava rock can, however, roll or blow away during wind or rain. White gravel rock have a great visual effect by reflecting the color of your home and the dark color of shredded tires makes landscapes pop. The sharp edges of walnut shells can also be used and are great for keeping critters out of your garden.

Lawn clippings are a great mulch choice for a vegetable garden. The fine texture allows them to be spread easily around small plants. Be careful not to place grass clippings too thickly as they can mat, not allowing moisture through to the soil below. Newspaper mulch works especially well to control weeds. Place eight layers of newspaper in your garden beds to control weeds and place two to four inches of mulch on top making sure to overlap the edges as weeds can break through. Use only newspaper text pages as color dyes may be harmful.

Leaves are another readily available material to use as mulch. Leaves not only provide the benefits of mulch but also decomposes into nutrient-rich leaf mold. Compost makes a wonderful mulch if you have a large supply. It improves soil structure and provides excellent source of plant nutrients.

Keep mulch from direct contact with the trunks of trees and shrubs as excess moisture right up against bark can cause disease and rot. All mulches should be applied two to four inches deep over relatively clean, weed-free soils. Always water deeply before spreading mulch. Winter mulch doesn’t actually keep plants in winter from freezing but mulched soil may not freeze as deeply. Mulches used to protect plants over winter should be loose material such as straw, hay, or pine boughs that will help insulate plants without compacting under weight of snow or ice.
Discarding Plastic Pots

Diana Morris, Yolo County Master Gardener

Being a constant gardener can mean a growing collection of plastic plant pots gathering in some darkened corner of the garden. All those Arboretum, nursery, and gift pots tend to collect as the contents of each is planted in the garden. Rather than adding to landfill excess, there are environmentally correct alternatives to discarding plant pots.

First, of course, would be to reuse the pots for propagating cuttings, transplants, seed starts, etc. A second alternative would be to visit any of the following drop-off points that accept plant pots for recycling:

**In Yolo County**

- UC Davis Arboretum
  - 1 Shields Ave
  - Davis 530 752-4880
  - *Accepts 1 & 5 gallon pots, call for exact location of collection bin.

- Three Palms Nursery
  - 26990 County Rd 95A
  - Davis 530 756-8455
  - *Accepts 1, 5, 15 gallon pots, also bottom flats (used to carry multiple pots)

- Youngmark Nursery Florist & Gifts
  - 617 West St
  - Woodland 530 666-1414
  - *Accepts 1, 5, 15 gallon pots

- Redwood Barn Nursery
  - 1607 5th St
  - Davis 530 758-2219
  - *Accepts 1, 5, 15 gallon pots

- True Value Hardware
  - 500 Railroad
  - Winters 530 795-4983
  - *Accepts 1, 5, 15 gallon pots

**Adjacent to Yolo County**

- Capital Nursery
  - 4700 Freeport Blvd
  - Sacramento 916 455-2601
  - *Accepts 1, 5, 15 gallon pots

- Lemuria Nursery
  - 7820 Serpa Ln
  - Dixon 707 678-4481
  - *Accepts 1, 5, 15 gallon pots

None of the nurseries contacted accepted pots smaller than one gallon. Plastic pots and bottom flats are not accepted in the curbside recyclers.
Send a Letter
to an Editor!

email: mgyolo@ucdavis.edu
Please put: Yolo Gardener in the subject line
or
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Woodland, CA 95695

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