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JOURNAL

Master Gardener

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INSIDE THIS ISSUE:

Photography: Donna Atwood

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Master Gardener Journal

Maricopa County Master Gardeners: Cultivating Plants, People & Communities since 1980
Master Garden volunteers are trained by University of Arizona faculty and staff during a 17-week course. They provide educational leadership to the community with research-based horticulture knowledge. Volunteers promote efficient use of water, fertilizers, and pesticides, and preservation of our desert environment.

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Northwest Valley Satellite location: Property Owners & Residents Association (PORA) Office
13815 Camino del Sol Blvd.,Sun City West,AZ 85375.Phone 623-546-1672.Hours: 9 a.m.-1 p.m.Monday-Friday.

East Valley Satellite location: East Mesa Multigenerational Center
7550 E.Adobe Rd.,Mesa,AZ 85207.Phone 480-985-0338.Hours: 9 a.m.-noon, Mondays and Thursdays.

Northeast Valley Satellite location: Via Linda Senior Center
10440 E. Via Linda,Scottsdale,AZ 85258.Phone 480-312-5810.Hours: 9 a.m.-4 p.m., Tuesdays and Thursdays.

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Cover Photos: (clockwise from top left)
Willow acacia,pink asters,and African daisies by Candice Sherrill;
Bridge at Tubac Secret Garden Inn by Linda A.Guy

Lucy Bradley,Extension Agent,Urban Horticulture

Master Gardeners are Making a Difference

by Lucy K. Bradley, Extension Agent, Urban Horticulture

With over 3 million people in Maricopa County, a large percentage of them newcomers to the Sonoran Desert, the need for public education regarding appropriate selection, placement and care of plants is tremendous. The Master Gardener program seeks to improve the health of plants and people, while promoting environmental responsibility in the garden. This includes the efficient use of water, fertilizers, and pesticides, and the reduction of green waste.

Two Initial Master Gardener Training classes were conducted in 2002. A total of 145 students took these 17-week home horticulture courses. Twenty-five MG Mentors guided these students through 51 hours of instruction, with 20 hours of organized volunteer activities. Based on pre- and post-test scores, students who graduated from Master Gardener Training:

- Improved their knowledge of soils, turf, pruning, vegetables, fruit trees, ornamentals, and botany.
- Are now more likely to apply water efficiently, select plants appropriately, use soil amendments effectively, prune properly, and identify common arthropods correctly.
- Are now less likely to attempt to control harmless or beneficial insects, and more likely to tolerate some plant damage before attempting control (IPM).

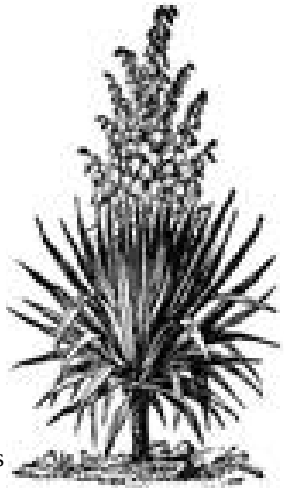
In 2002, Maricopa County Master Gardeners donated 36,000 hours, the equivalent of 17 full-time staff members, conservatively valued at $15/hr., for a total of $530,400. Master Gardeners:

- Staffed Horticulture Help-Desks at the main office and three satellite offices, where they assisted 3,400 walk-ins with gardening and landscaping questions.
- Fielded 25,000 gardening and landscaping calls. In a 2001 follow-up telephone survey of 123 people who had called in on the gardening hot line, 86 percent intended to reduce herbicide and pesticide use after talking to a Master Gardener.
- Managed a 250-page website that gets 1,500 hits per week.
- Staffed a list serve that responded to 4,000 questions in 2002.
- Maintained an Interpretive Trail and Demonstration Garden at the Extension Office, including a Water Garden, Heritage Roses, Rare Fruit, Herbs, Vegetables, Flowers, Children's Garden, Healing Garden, Citrus, and Turf Demonstration gardens.These gardens are open to the public 24 hrs/day; guided tours were conducted for 30 visiting groups.
- Hosted East and West Valley Fruit Clinics: 8 concurrent speakers, 3 1/2 - hour sessions, and 335 participants. In a follow-sup survey of 107 participants: the average rating for the session was 9 out of a possible 10; 88 percent felt they learned how to irrigate, fertilize, and use pesticide alternatives properly; 80 percent were likely to change the way they used both fertilizers and pesticides; 90 percent planned to irrigate more deeply and less frequently.
- Sponsored Fall and Spring Garden Fairs: 700 participants.
- Staffed Q & A Booth at 12 trade shows and similar events, information shared and questions answered for 100,000 plus.
- Conducted Garden Tour: 868 participants, 6 hours of educational talks, materials, and tours. "A truly superb tour. The organization, good directions! and especially the educational components made this tour stand head and shoulders above other tours I've attended. Truly a tribute to a great group of volunteers and wonderful gardeners!"(Participant 4/1/2002).
- Provided a Speakers Bureau, which gave 82 talks reaching 3,922 people.
- Taught 13 intensive 3-hour classes, ranging from "Citrus Care"to "Wildflowers," reaching 290. Survey of 53 participants indicated that 87 percent found the information offered would help them irrigate properly, use pesticides appropriately, and become more confident in their ability to maintain their landscape to reduce green-waste.
- Provided regular information for several Valley Newspapers and Magazines, including The Arizona Republic, Phoenix Home and Garden, East Valley Tribune,AZ Senior World, and Sun City Papers.
- Wrote, edited and distributed this publication, the Master Gardener Journal, hard copies distributed to 700 subscribers and available free on-line.

Thanks to all Master Gardener volunteers for your terrific support. As we face the budget challenges of the coming year, I hope you will continue in your excellent efforts. You make all the difference!

> *"I have learned more from the Master Gardener training course in six month's time than in 30 years in the professional landscape business."*
>
> Course Participant
> 2/27/2002

Calendar of Events



APRIL, 2003

4/5 thru 4/6 — 7th Annual Home Garden Tour at Tucson Botanical Garden. Saturday & Sunday from 10:00am to 4:00pm. Here is your chance to take a peek behind the fences of five beautiful Tucson gardens. From the dramatic to the whimsical, the Tucson Botanical Gardens 2003 Home Garden Tour offers something for everyone. You will find lots of ideas you can adapt for your own garden, or just enjoy the beautiful scenery. The five gardens chosen for the 2003 Tour were designed by local landscape architects as well as by homeowners, and include water features, vegetable gardens, small gardens packed with beauty, and a railroad garden village. Your ticket will also admit you to the Tucson Botanical Gardens where you may enjoy the many gardens and exhibits including the Tucson Garden Club Flower Show and Art in the Gardens. Tickets are on sale at the Tucson Botanical Gardens and the following nurseries: B&B Farm, Civano, Harlow Gardens, Mesquite Valley Growers and Rascon. For more information call the Tucson Botanical Gardens: 326-968, Ext 10. Tickets: Public in advance: $14. Public on the day of: $16.

4/5 thru 4/6 — 19th Annual Blessing of the Vine Festival in Elgin, Arizona. Saturday & Sunday from 11:00am to 4:00pm. Location: The Elgin Complex. Cost: $13/person. Oldest wine festival in Arizona. Sample world-class wines, stomp grapes, listen to great music, and enjoy life in the heart of Arizona's wine country. Contact: Gary Reeves at 520/455-9309, or email festivals@elgin-wines.com.

4/12 — Herb Festival at Boyce Thompson Arboretum, 37615 Hwy 60, Superior, Arizona. Saturday from 11:00am to 3:00pm. The charming and enchanting Wing Memorial Herb Garden is the setting for this festival. With live music and culinary demonstrations of herbal cuisine, this event also includes children's games and crafts, as well as exhibits by local herbalists - Fun for the whole family! There will also be a variety of herbs for sale.

4/13 — Art *al Fresco*: Art-in-the-Garden Exhibit & Auction at Tucson Botanical Garden. Sunday from 8:30am to 4:30pm. Sculptures, hand-painted tiles, ironwork, and pottery are just the beginning of the types of garden art you will see interspersed throughout the natural beauty of the Gardens. Expect the unexpected on a walking tour down pathways commemorating eras of history such as 'Old Mexico,' 'Way Out West,' 'Victorian Times Americana,' 'Roaring 20s,' and 'Psychedelic 60s.'

4/26 — Earth Arbor Day at Boyce Thompson Arboretum, 37615 Hwy 60, Superior, Arizona. Saturday from 11:00am to 3:00pm. Enjoy live music beneath the canopy of trees in the Arboretum's Pine Grove and Australian Forest. Get tips on tree care and planting techniques from Arboretum horticulturists and enjoy tree exhibits, crafts and children's activities.

4/26 — Herb Sale and Botanical Book Sale & Signing at Tucson Botanical Garden. Saturday from 9:00am to 3:00pm. Admission: Free during sale hours. Tucson Botanical Gardens' Herbs of the Old Pueblo brings together useful plants that are part of our heritage. The Tohono O'odham; Jesuit missionaries; and settlers from Mexico, Asia, and the eastern United States all grew and shared seeds, roots and cuttings of the herbs we still use today. A selection of plants will be interpreted in the TBG Herb Garden and offered at the sale. Plant lists will be made available at the sale for those who are interested. Visit the Botanical Book Sale & Signing in the Historical Gardens area. Authors will be on hand to autograph and discuss their books on all manner of subjects in the areas of gardening, botany and natural history.

MAY, 2003

5/24 — Learn Your Lizards at Boyce Thompson Arboretum, 37615 Hwy 60, Superior, Arizona. Saturday from 9:00am to 11:00am. Why do Arizona lizards do "pushups" to display their azure abdomens? Participants can observe this unique behavior, learn why lizards have blue bellies, and about other Sonoran desert adaptations during a guided walk. Arizona Game and Fish Department herpetologist Daren Riedle will lead the walk, which lasts an hour or two up the main trail that loops for 1.5 miles through the Arboretum. Participants should carry binoculars and water bottles, as well as wear a hat and dress expecting a warm day.

5/24 — Gardening with Ease at the Desert Botanical Gardens. Saturday

by Terry Tanner, Master Gardener

from 9:00am until noon. 3-hour workshop. Gardening with Ease is not a contradiction in terms, but a real possibility. Many gardeners suffer needlessly and quit earlier in life because they use their bodies improperly. The result of misuse of joints is heartbreaking, not to mention backbreaking. The Gardening with Ease Workshop teaches you how to alter the use of your body while lifting, bending, pushing, or digging, in order to make gardening activities more productive and less painful. Turn drudgery into joy. The vehicle for change is the Feldenkrais Method of Awareness Through Movement, a sensory-motor educational approach to improving body mechanics and use of energy. You will be lying or sitting on the floor, and will be verbally guided in movement explorations in order to become aware of your body parts and how they can work together with more ease and pleasure. Then you will apply this awareness to the body mechanics of actions in the garden. Wear comfortable clothes and bring a mat or blanket to lie on. Register at The Desert Botanical Garden-201 N. Galvin Parkway, Phoenix. Phone: (480) 941-1225.

ALSO ON THE CALENDAR
6/18 thru 6/21 — 2003 International Gardener Conference.
Cincinnati/Northern Kentucky Department of Horticulture, University of Kentucky, N-318 Agricultural Science Building, North, Lexington, KY 40546-0091. Phone: 859-257-3249. ■

Things to Expect & Things to Do

by Terry H. Mikel, Extension Agent, Commercial Horticulture

CITRUS FRUIT DROP will occur. The shed of newly set fruit is a natural thinning, worsened by hot weather and dry winds. Water moderately during this season and fertilize after this seasonal drop.

POWDERY MILDEW on roses, euonymus, cucurbits and grapes can occur. Spring temperatures are ideal for infection. Preventive treatments are much better than corrective ones.

SEASONAL LEAF DROP on carob, African sumac, pine, and other trees will occur as weather warms.

FALSE CHINCH BUGS migrate to greener pastures as the desert dries in the heat.They usually only attack plants that have foliage on the ground.

METALLIC FLEA BEETLES make their annual presence known. They're especially fond of Mexican primrose, and often provide a much-needed pruning to this plant.

IRONWOODS BEGIN TO BLOOM in early summer. It's something to see and enjoy their bloom, especially up close.

LAWNS will begin to show stressed areas if the sprinklers are not putting out water uniformly over the area. Check out "Landscape Watering by the Numbers" for the best ways to audit your sprinkler systems.

FERTILIZE BERMUDA GRASS LAWNS during late April or early May. Hold off on dethatching until May or June for best results.

TERMINAL DIEBACK IN PINES is usually a physiological response we call pine blight. It's been most noticeable this year due to the extreme heat and lack of rain in 2002. Check the soil near the trunk. Trees with circling roots express the worst symptoms.

MULCH GROUND SURFACES under roses and other heat-sensitive plants.

APPLY IRON to bottlebrush, pyracantha, silk oak, and other plants with iron deficiency symptoms. Chelated iron works faster. Reducing watering frequency often helps.

THINK HOUSEPLANTS for deeply shaded, outside areas.Green spiders, philodendrons,dracaena,crinums,scheffleras, and tupidanthus do wonderfully.

DON'T DETHATCH BERMUDA GRASS or hybrid Bermuda grass lawns until May.

WILDFLOWERS - harvest seeds from your beds for next season. A simple way is to put a brown paper bag over the whole plant and pull it up. This lets the seeds stay in the bag. Label the bag!

IRON DEFICIENCIES are best treated with chelated forms of iron.

TRANSPLANT OR PLANT PALMS in the summer. Warm soils are needed for the roots to start growing.

PROVIDE A LIGHT SHADE (less than 50 percent) over tomatoes. This helps the plant, and discourages the sun-loving insect that carries curly top virus from visiting.

PRUNE DESERT TREES like mesquites, palo verdes, and acacias now if necessary. This seems to heal the pruning wounds faster. ■

Pine Bark Beetle Outbreak in Arizona

by Tom DeGomez, Forest Health Specialist with the University of Arizona Cooperative Extension Forest Health Working Group, and the Arizona Bark Beetle Task Force which includes professionals from University of Arizona, Northern Arizona University, the United States Forest Service, and Arizona Public Service

Arizona's ponderosa pine and piñon forests have sustained significant impact from the bark beetle outbreak of 2002. Conservative estimates, based upon U. S. Forest Service aerial surveys of federal lands, place the number of dead ponderosa pine statewide at 2 million on 503,000 acres. This estimate is admittedly low, because the surveys were done between late July and October, and many additional trees were detected during the fall. One area was re-flown in October, and levels of mortality increased more than 300 percent over the earlier estimates.

The most heavily impacted forests of the state are the Tonto,Apache-Sitgreaves, and Prescott National Forests, and the San Carlos Apache Reservation and adjacent state and private lands. Some stands in these forests have 80 to 90 percent tree mortality; others have less than one percent mortality. Mortality in piñon pine woodlands is equally high. A late-season survey of 28 square miles of piñon woodland southeast of Flagstaff revealed 700,000 dead trees, or more than 90 percent of the mature piñon trees in the area.

Bark beetles have also attacked trees in the juniper and spruce families. Native junipers, native Arizona cypress and Leyland cypress are among those being killed by the cypress bark beetle. Spruce bark beetle activity has occurred on over 35,000 acres of spruce as well.

The two main reasons why bark beetles are killing so many trees is that the forest has too many trees and the trees are very dry. Overcrowded forest conditions, coupled with drought, lead to the high probability of beetle attack. Unfortunately the winter of 2002-03 has not been as wet as hoped for. Moisture levels for the winter of 2002-03 (October to January) are running 3 inches below normal. Current dry conditions, coupled with very high levels of over-wintering bark beetles, could very well lead to greater bark beetle outbreaks in 2003. Recent rains in mid-February could greatly improve forest health; however it may take several years for stressed trees to rebuild carbohydrate stores. Stored carbohydrates are used by the tree to produce beetle-fighting resin (pitch).

The forests of Arizona have been able to survive in relatively dry conditions because in past centuries, low-intensity fires helped to maintain a low density of trees in the forest.Whereas, in the past century we have controlled fire, which allowed many forested areas to become overcrowded.

The best way to avoid having trees attacked by bark beetles is to take preventive measures. First and foremost is to lower tree density through thinning. Many people are unsure as to which trees should be removed. In these cases it may be best to consult with a certified forester or arborist. For a listing of certified professionals consult the yellow pages, call your local University of Arizona County Extension office, or log on to www.safnet.org/certified/directory.htm to find a certified forester, or www.isa-arbor.com to find a certified arborist.

When removing trees it is important to treat the logs and slash properly, or you may promote increased beetle populations in the down material. If you are not interested in saving the logs, they can be hauled to the landfill or chipped. If they are chipped, don't pile the chips deeper than 3 inches next to live trees, as the chips may attract bark beetles. Try to keep chip piles in the open sun and as far from live trees as possible.

If bark beetles are found in the logs and you wish to keep the logs for firewood, you have several options: Utilize the firewood prior to April 1. Peel the bark from the logs to expose the brood to natural enemies. The bark should then be raked into a pile and burned.

Covering sun-exposed stacked logs with clear plastic in an attempt to cook beetles that are over-wintering in the bark may not work as well in practice as in theory. If you use this method, keep the stacks small (2 to 3 layers high), and check the plastic often for tears and any other openings that may allow the adult beetles to escape.

The small slash (limbs and tops less than 3 inches in diameter) is less likely to be used by beetles. This material can be chipped, or piled for burning this winter. When piling, put the smallest diameter material in the middle with the largest on the outside.

Often property owners will have several trees that have significant value in

Photo by A. Steven Munson, USDA Forest Service

their landscape, either because of their size or their location. These high-value trees can be irrigated or sprayed with insecticides to prevent infestation.

If these trees are irrigated, they should be given enough water to wet the soil at least 2 feet deep. The water should be applied in a donut-shaped pattern at the drip line or outer edge of the trees branches. It generally takes about 2 inches of rain to soak soil to a depth of 2 feet. Check the soil 6 to 8 inches deep just outside the drip line of the trees monthly. If the soil is dry, then water. Generally, the months that most often warrant watering are May, June, and October. However, depending on weather patterns watering may be needed any month of the year. If current dry conditions continue this winter you may need to irrigate in March or April. Keep in mind watering restrictions that may be in effect in your community and follow those guidelines as well.

Applications of fertilizers will not help protect trees from the effects of drought, and will not protect against bark beetle attacks.

Trees that are not yet infested can be protected from beetle attacks by spraying with insecticides. When spraying, the entire trunk and the bases of large branches of the tree 4 inches in diameter and greater must be soaked. Spraying large trees is generally not a practice that homeowners can do themselves. To locate a certified pesticide applicator, call the Arizona Structural Pesticide Control Commission at 800-223-0618. The only registered chemicals for this purpose are carbaryl and permethrin. You must use a product that is especially formulated for bark beetles, such as Sevin SL, Dragnet, or Astro. This is a protective measure only; it will not kill beetles once they enter the tree. Typical home and garden products containing carbaryl or permethrin will be ineffective. If the correct material is applied properly, it should be effective for an entire season. Spraying should be completed prior to April 1 to ensure a full season of protection.

The only known direct control method is the removal of infested trees. A good rule to remember is: *"If a tree is brown cut it down, if in doubt cut it out."* If we leave dead trees standing, we run the risk of the new generation of beetles leaving the tree and attacking more trees. Finding reddish-brown boring dust in the bark crevices of a tree indicates that the tree has been successfully attacked, and the tree should be cut down even if the tree is still green at that point. If dead trees are next to houses or other structures,they can become a hazard tree.

Insecticide injections or systemics have not proven effective against bark beetles. Many trees have been injected with seeming success, when what has actually happened is that the treated tree successfully pitched out the attacking beetle with resin prior to the treatment. The tree was then injected with insecticide when in fact no beetles were actually in the tree. The tree saved itself! Studies have proven that injecting chemicals will not kill bark beetles attacking conifers.

There are several miracle cures being promoted to save trees from bark beetles. These materials may not have gone through extensive research to test their effectiveness. Buyer beware! If what is being marketed sounds "too good to be true" it generally doesn't live up to its billing.Remember, it is against the law to use unregistered pesticides, and using pesticides for insects not listed on the label is unwise.

The University of Arizona, Northern Arizona University, and U.S. Forest Service will be engaged in research to test materials to prevent and control bark beetles in Arizona. When these studies are completed and reviewed, the results will be released to the public as soon as possible.

Many trees may only have the top half of the tree dead. Most often what happens is that the lower half of the tree will be killed shortly thereafter. Do not cut the top out of the tree hoping that the rest of the tree will recover. It is best to remove such trees to prevent the spread of beetles to other trees and to prevent them from becoming a hazard tree. You need not wait until the entire tree turns brown; many adult beetles may have flown from the tree before turning brown.

Remember, the most effective method for preventing bark beetle infestations is to thin overly dense stands of trees. If you need more information, please contact your local University of Arizona Cooperative Extension office, State Land Department, or your local fire department.

Additional information can be found at http://ag.arizona.edu/extension/fh/, or http://ag.arizona.edu/yavapai/. ■

Frequently Asked Questions about Bark Beetles

by Jeff Schalau, Yavapai County Director, Agriculture and Natural Resources

HOW DO PINE BARK BEETLES KILL TREES? Pine bark beetles *(Ips sp. and Dendroctonus sp.)* feed primarily on the inner bark (phloem tissue). This has the same effect as girdling (peeling off the bark to exposed wood) of the tree. Damage caused by their feeding acts as an internal tourniquet cutting off the flow of nutrients from the leaves to the other parts of the tree. As the damage progresses, sugars and other complex compounds cannot be translocated downward from the leaves to non-photosynthetic areas of the tree. The beetle can also introduce a blue stain fungus, which grows into the wood (xylem). This fungus prevents water from being transported upward to the leaves. Both of these factors contribute to the decline and death of colonized trees.

WHAT ARE THE EARLY SIGNS THAT BARK BEETLES HAVE COLONIZED A TREE? Needle discoloration is the primary early sign of colonization by bark beetles. Needles fade from dark green to pale green to straw yellow to a rusty red color. The progression from green to red can occur as quickly as a couple of months or as long as several months. Other signs are pitch tubes, boring dust, and galleries (tunnels under the bark). Pitch (resin) is the tree's only natural defense against bark beetles. Beetles colonizing relatively healthy trees will usually create pitch tubes where the beetle entered the tree. If the tube is connected with a tunnel that continues into the bark, then that beetle successfully entered the tree. Fine boring dust is sometimes visible and caused by bark beetles chewing the bark to enter the tree. During initial colonization, the boring dust is bright red. To inspect for galleries, you can remove a portion of the bark with an axe. This should be done only after the tree appears to be dead. Galleries should be visible under the bark and may contain larvae (grubs), pupae (cocoons), and/or adult beetles on recently killed trees. One or all of these signs or symptoms may be present.

HOW DO BARK BEETLES SELECT A SUSCEPTIBLE HOST TREE? Stressed pine trees emit volatile compounds (turpenes). Bark beetles have evolved to detect these compounds and use them to identify suitable host trees. Many insects communicate with other insects by emitting pheromones (chemical compounds that trigger a specific behavior). Once a bark beetle has located and colonized a susceptible host tree, it emits an aggregation pheromone that attracts other beetles. After enough bark beetles are attracted to that tree, beetles emit an anti-aggregation pheromone signaling them to locate another host tree. In this way, it is thought that bark beetles partition available food among the population.

WHAT ARE THE NATURAL ENEMIES OF BARK BEETLES? Bark beetles have an array of natural enemies. Woodpeckers and other birds may eat some bark beetles. Some insects are known to help control bark beetle populations under endemic (non-outbreak) population conditions. Predaceous beetles such as the blackbellied clerid *(Enoclerus lecontei)* and a trogositid beetle *(Temnochila chlorodia)*, a predaceous fly *(Medetera aldrichii)*, and parasitic wasps are natural enemies of bark beetles, but rarely control their populations. These insects are known to have some effect on bark beetle populations, but most experts feel that parasites and predators of bark beetles are a minor factor in controlling bark beetles under the current pandemic outbreak. Northern Arizona University is initiating a study to try to understand the relationship between predators (primarily birds) and bark beetles.

WHAT ARE SOME BARK BEETLE-RESISTANT EVERGREEN TREES THAT CAN BE USED IN NORTHERN ARIZONA LANDSCAPES? Some suitable evergreen trees are Deodar cedar *(Cedrus deodora)*, Atlas cedar *(Cedrus atlantica)*, and Lebanese cedar *(Cedrus libani)*. These have few, if any, pests and are relatively fast growing. Evergreens have the advantages of providing year-round privacy screening and pine-like foliage. They do require infrequent irrigation to keep them healthy. These species are not as fire retardant as deciduous trees due to their resin content. For this reason, evergreens are not recommended for use next to structures where they may increase risk of property loss in case of forest fire.

WHAT WILL BE THE LONG-TERM IMPACTS OF THE CURRENT BARK BEETLE OUTBREAK? The disturbance caused by bark beetle mortality will undoubtedly change vegetative characteristics. Many of these changes could be perceived as beneficial to the impacted ecosystems. A significant reduction in woody species will likely be accompanied by an increase in native herbaceous species such as grasses and forbs. These species have reduced water consumption and are desirable forage for wildlife and domestic livestock. In addition, grasses have fibrous root systems that stabilize soil and aid in soil development. The reduced water consumption could also result in increased water yields from impacted watersheds. This increase in water yield could potentially help recharge local and regional aquifers. Other potential ecosystem benefits will certainly be recognized over time. The risk of catastrophic wildfire is increased in areas where bark beetle-killed trees are not removed. Other long-term impacts are largely unknown. However, potential negative impacts could be: loss of soil due to accelerated erosion; increases of invasive plant species in response to disturbance; decreases in real estate value on properties where tree losses were very high. ■

Choosing a Good Nursery

Photography: Candice Sherrill

by Lisa Dubas, Master Gardener Intern

A common question asked of Master Gardeners is what are the best nurseries in town? This is a particularly significant issue with newcomers to the Phoenix area, since our soils and climate are different and we don't have the same growing seasons. So how do you decide whether a nursery or garden center is worthy of your patronage? By the end of this article, you should be able to answer that very important question for yourself.

One of the first things you should assess is the visual quality of the plants. Is the nursery trying to sell plants that look bad? Are plants out of season (e.g. annuals), not watered enough, not getting enough sun, getting too much sun, or infested with insects? You can refer to Maricopa County Cooperative Extension publications such as AZ 1100 (flower planting guide for the low desert) and other low-water-use landscaping books for information concerning the life cycle of the plants you intend to buy. Also remember that insects prefer weaker plants, so if a plant has an insect problem it may be of poor quality. Examine the leaves, bark, and dirt for the presence of insects. If many of the nursery's plants fail to meet these criteria, go to another nursery.

What about the staff at this nursery? Are there Arizona Certified Nursery Professionals or Master Gardeners available to answer your questions? Do the employees know enough about the plants? Can they tell you about the water and sun needs of the plant without reading the label? Can they tell you the common and botanical name for the plant? Can they tell you if a plant is poisonous (for those of us with curious children and pets)? Are they trying to sell you products you don't need? Do you feel like you can trust them? If the quality of the staff is in doubt, go to another nursery.

Does the nursery carry a wide variety of plants? Is most of the stock from local growers (already adapted to our climate), or were many plants grown out of state (may require more care and time to establish)? Does the nursery have a large selection of low-water-use/desert-adapted plants? Will the nursery order plants for you if asked? If the answers to these questions are no, go to another nursery.

Carefully assess the nursery's pruning practices. Pruning actually causes wounds to trees and shrubs, making them more susceptible to pests. Refer to the Maricopa County Cooperative Extension publication AZ 1139, and "Desert Landscaping for Beginners," for more information on proper pruning. If the nursery's pruning practices seem consistently poor, go to another nursery.

Do the plants look too large for their containers? Do you see 5-gallon containers holding 10-gallon trees, and 1-gallon containers with 5-gallon shrubs? Are there roots visible in the holes at the bottom of the container, or do you see signs that protruding roots have been trimmed at those holes? If you can, take the plant out of the container and see if there are roots circling around the plant (root-bound). If it isn't possible to pull the plant out, move some soil away from the top of the plant to see if the roots seem to be growing in a circular pattern. Every nursery or garden center may have a few root-bound plants, but if you answer yes to these questions with many of the plants you look at, go to another nursery.

What about the nursery in general? Does the store have a return policy? Do they sell everything you will need (pots, soil, fertilizers, mulch, etc.), or just plants? Are the plants clearly labeled with the common name, botanical name, light requirements, and water requirements? Have you heard mostly good comments from people, or just complaints about that particular nursery? Is the staff helpful? Do the prices seem reasonable? Do they sell low-water-use reference books geared specifically for helping customers grow plants in the desert? Do they give out information pamphlets, such as the Maricopa County Cooperative Extension publications?

Please remember that any nursery can have a few bad days. It's a good idea to visit several times throughout the year just to look around, before forming an opinion. However if you plan ahead, know what to look for, and know what questions to ask, you will easily find the best nurseries in town. ■

A Color Palette for Your Landscape

Photography: Candice Sherrill

Color is such an integral part of our lives, yet we so often take it for granted. Take a few minutes to study your landscape. Now picture it in black and white. A garden devoid of color would not appeal to most of us. Our homes, gardens, and even our clothing reflect our personalities. We define ourselves through the colors we choose to surround ourselves with.

Faced with a tantalizing display of plants at your local nursery, how do you decide the best use of color in your landscape? Although it is ultimately a matter of personal taste, there are some basic principles to bear in mind. A color wheel, which you may be familiar with, can help you visualize color combinations. It can be a valuable tool in designing your landscape.

Red, blue, and yellow are primary colors. They are equidistant on the color wheel. These are pure hues that cannot be made by mixing colors. The secondary colors are purple, green and orange. Each of these is created by combining two primary colors. How do we apply this information to landscape design? There are certain qualities particular to each color.

Red, orange and yellow are warm colors. They visually move the eye forward. Theses hues are exciting, happy, and energetic. Use them to brighten or highlight an area, or to draw attention away from an eyesore. But remember, too much can be overpowering.

Red is eye-popping, exhilarating, and inviting—perfect to utilize as a focal point. It speaks of passion and dominance. Research has shown that the color red stimulates conversation and the appetite, so use it near your outdoor dining areas.

Orange is a vivid color, also said to stimulate the appetite. Though not quite as bold as red, it is an exuberant addition to the landscape palette.

Yellow is lively, the essence of joy and cheerfulness. It can visually expand an area, providing the illusion of spaciousness. This is the color of sunshine, likely to bring a smile to the faces of garden visitors.

Blue, green, and purple are known as cool colors. They promote feelings of peacefulness and calm. These subdued hues tend to recede into the background, and are not easily seen after dusk or in the shady parts of your garden.

Blue says "tranquility." This serene color reminds us of sky and sea, and blends well with other colors. Use it en masse to make it more visible.

Green is the backbone of the landscape. Its refreshing and varied shades serve to unify the garden palette. It is so prevalent we may have a tendency to forget how significant its role is.

Purple, regal and mystical, sometimes shows itself in foliage as well as flowers. Purple can be dramatic, or a subtle addition to the garden, depending upon the colors you decide to use with it.

Another set of hues on the color wheel combine a primary and its nearest secondary color neighbor. Red-orange, yellow-green and blue-purple are examples of "tertiary" colors.

Variations of these colors can be light or dark, bright or muted. Add white to any color on the wheel, and you get a tint or a pastel. Pink and lavender are common pastels found in the garden.

Pink evokes feelings of romance and sentimentality.

Lavender is an enchanting, calming pastel. Like the scent of lavender, this color tends to be a stress reliever.

White and gray are neutral colors. Neutrals provide transition, blend hues in the landscape, and enhance individual colors.

White may fade under our harsh desert sun, but it comes alive in the shade and at night with a special radiance. Crisp and pure, you can count on it to glow as darker colors fade after sunset. Incorporate white into areas that will be noticeable in the evening, such as patios or entryways.

Gray or silver foliage is especially effective as a backdrop for brighter colors. It is a delightful color in our desert climate.

by Sandy Turico, Master Gardener

Photography: Candice Sherrill

Green is not traditionally considered a neutral color, but in a garden situation it creates stability by helping our eyes to transition effortlessly from one area of the garden to another.

A monochromatic color scheme utilizes only one hue and its variations, creating an elegant effect. Include variations of the color you choose, so your design does not look monotonous. Visualize a garden of yellows; perhaps pale lemon yellow, a dazzling sunshine yellow, and deeper gold tone. Add some white accents to make the color sparkle!

A color scheme involving two hues is the complimentary color scheme. Colors opposite each other on the color wheel are used. Blue and orange, red and green, or yellow and purple are possibilities. These combinations are striking because one color intensifies the other, a sure attention-grabber.

Another option to consider is the triadic color scheme, where three colors equidistant on the color wheel are brought into play. Imagine your garden dressed in the primary colors… red, blue and yellow. A grouping of tertiary hues such as blue-purple, yellow-green and red-orange would be a delightful combination.

An analogous color scheme is achieved by making use of hues that are adjacent to each other on the color wheel. In this scenario,two or more colors located next to each other on the color wheel are chosen. This grouping will achieve a subtler outcome, soothing and restful,since the eye is less apt to bounce between colors. Orange, yellow-orange and yellow hues, for example, merge into a dazzling but calming display.

HERE ARE SOME OTHER POINTS TO CONSIDER:

Color evokes different emotions… follow your instincts when choosing a color scheme. If you don't quite know where to start, take a close look at the inside and outside of your home. Your landscape colors should blend with the exterior of your house. Moreover, you've probably already made use of your favorite colors inside your home. You can even check out your wardrobe for ideas!

The principles of color can also apply to the hardscape or the non-living elements in the garden.

Simplicity is best. Stick to one, two,or three hues in your design. Add in too many colors, and you may end up with a chaotic look. Interspersing a few colors in an area evokes an informal, carefree mood. Using restraint in your color scheme will result in a more formal, elegant feel. If you need help visualizing color combinations, invest in a color wheel. You can find one in an art book, an art supply store or on the Internet.

Incorporate both advancing and receding hues in your landscape to add depth to your design.

Check out the "Landscape Design" chapter of the Master Gardener manual, as well as the Maricopa County Home Horticulture Publications available from the Cooperative Extension Office. Other resources include horticultural and landscape books written for our region. These sources can provide valuable information about low-water-use plants. You can research foliage and blossom color, light and water requirements, as well as plant size and hardiness information for plants that are indigenous or adapted to our climate.

How will your landscape look during the different seasons? An easy way to envision seasonal changes is to create a plot plan. Lay out your landscape plan on graph paper. Make four copies of the plan to represent the four seasons. Next, color in the plantings on each graph to signify the colors you can expect to see in that particular season. Look for variety, simplicity, and a balance of color in your design, and adjust it until you have the look you desire.

Remember, keep it simple and let your instincts guide you.Above all, have fun with color! By combining your knowledge of color with your own special style, you can turn your landscape into a work of art! ■

Zucchini: A Treat in the Heat

BOTANICAL NAME
Cucurbita pepo

COMMON NAMES
Zucchini, as it is most commonly know in America, is an Italian word.These veggies are known as "courgettes" in parts of Europe, and "vegetable marrow" in Britain. Other names include "long marrow" and "garden marrow".

GENERAL
Zucchini is a summer squash, meaning the fruits have soft, edible skin. Summer squash are fast growers that can be harvested in 35 to 55 days.

Zucchini squash is highly rated for economic value, based on the period of time between planting and harvest, as well as the number of pounds produced per square foot. Most plants yield an average of 3 to 9 pounds of young fruit. In recent years, zucchini has surpassed other types of summer squash in popularity as a fresh and cooked vegetable.

Squash is a member of the *cucurbita* family, which includes melons, pumpkins, cucumbers, and gourds.

There is a common misconception that these family members cross-pollinate (i.e., cucumbers will cross with pumpkins), however cross-pollination only occurs between varieties of the same species.Therefore, when more than one variety of the same species (in this case, *C. pepo*) are grown together in a garden they will easily cross, resulting in daughter plants with different fruit from either of the parents. So be forewarned if you plan to save seeds when planting your zucchini with varieties such as pumpkin, crookneck, or acorn squash!

HISTORY
Archaeologists traced the origins of summer squash to Central America, ranging into Mexico and the northern parts of South America dating back to 5500 BC, where they were an integral part of the ancient diet. Within 50 years of the European colonization of the Americas, summer squash varieties were introduced in Europe. It is believed that the Italians then developed zucchini, giving it the name we now use.

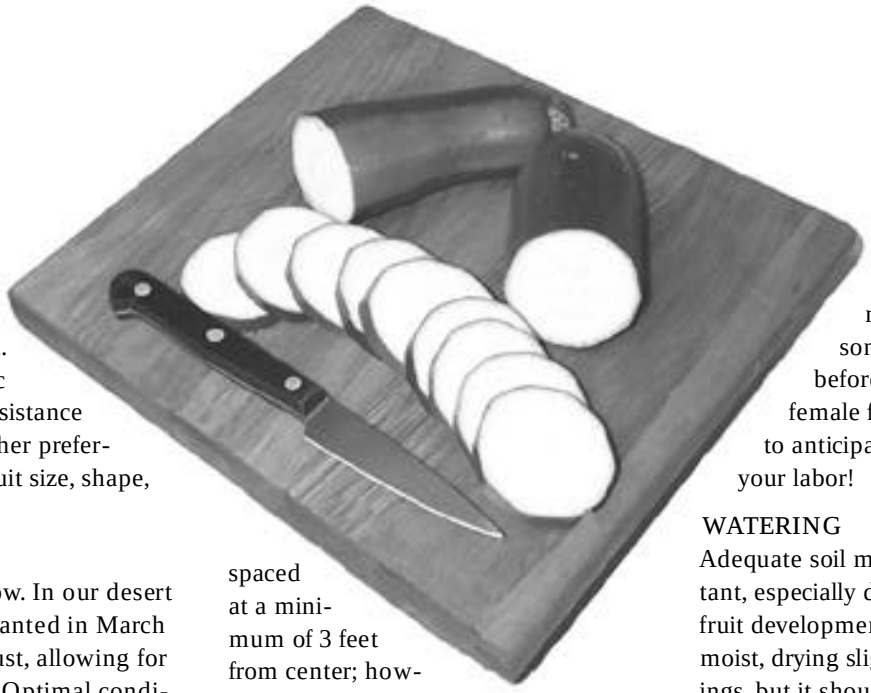
DESCRIPTION
Generally, zucchini grows on bushy non-vining plants. Most commonly it bears cylindrical fruit, but new cultivars include round and intermediate shapes. Fruit color varies; from yellow tones to greens so dark they are nearly black. Many have speckles and/or stripes.

Varieties may be classified by their bush habit, from an open habit where the leaves are more sprawling and widely spaced to a dense habit where leaves are crowded and harvesting is more difficult. The plant canopy on some varieties may change during the season due to plant nutrition, weather, irrigation and pollination. The leaves of the zucchini plant are large, dark green, and mature leaves are characterized by mottled silver-gray splotches and streaks on the leaf surface. These light markings are sometimes mistaken for a mildew problem.

Squash plants produce male and female flowers on the same plant. The female squash flower has a miniature fruit at its base and is borne on a short stem. The male flower can be identified by its long slender stem and a stamen in the flower's center that provides pollen necessary to the development of fruit. If you look closely inside male and female flowers set side by side, you can easily see which is male and which is female.

Photography: Candice Sherrill

by Laurel Reader, Master Gardener



CHOICES FOR THE DESERT

Before making your cultivar selection, determine your criteria. While earliness, prolific fruiting, and disease resistance are most important, other preferences might include fruit size, shape, color, and taste.

HOW TO GROW

Zucchini is easy to grow. In our desert conditions it can be planted in March and again in late August, allowing for two harvests per year. Optimal conditions for planting zucchini include the right location, proper soil preparation, and favorable temperatures. Being tropical in origin, summer squash is a frost-sensitive annual plant; temperatures over 70 degrees Fahrenheit are favorable for growth and development. Sunlight is essential, so locate plants in an area that receives 6 to 10 hours daily.

The most common method of propagation is direct seeding into prepared beds. Although you can purchase starter plants from a nursery, more choices are available if you start from seed. Keep in mind that you only need a few seeds from any package—3 or 4 plants will sufficiently feed a small family. The seeds you save can be planted in the next few years, since most retain their viability for up to 4 years.

After the danger of frost has passed, seeds should be planted to a depth of 1 inch in light-textured,well-drained soil. Seed germination requires a minimum soil temperature of 60 degrees Fahrenheit. The preferred soil pH range is 6.0 to 7.5. Generally plants are spaced at a minimum of 3 feet from center; however in intensive gardening situations this can be reduced to 1 1/2 to 2 feet between plants.

Monitor plants closely and often for pests or disease. Be sure to look at the undersides of leaves where many zucchini pests reside.

When planted in compost-rich soil where nutrients are released slowly, additional fertilizers may not be required. An organic liquid fertilizer such as liquid seaweed may be applied at 2- to 3-week intervals where soil isn't as fertile. Avoid high-nitrogen fertilizers; they will only encourage more leaves and stems.

For best fruit production pollinate the zucchini flowers yourself early in the morning before the flowers close. The easiest way I've found is to cut a male flower from the plant, carefully remove the petals leaving the stamen intact, and then dab the stamen directly into the center of a female flower. Of course if you have plenty of bees or other beneficial insects around the garden, they will take care of pollination for you! Don't be discouraged at first if all you find are male flowers. Many times squash plants produce more males early in the season. It won't take long before you begin to see female flowers and can begin to anticipate the first fruits of your labor!

WATERING

Adequate soil moisture is very important, especially during flowering and fruit development. Soil should remain moist, drying slightly between waterings, but it should never be allowed to dry completely, nor should it remain too soggy. Avoid overhead watering—water the soil, not the leaves. Soil-borne diseases can cause problems to plants if water splashes up from the soil to the leaves. Water deeply (2 to 3 feet) once a week during the cooler weather, and increase watering to 2 or 3 times a week in the summer. Mulch heavily with organic material to help maintain and moderate soil moisture. Wilting leaves during the hottest part of a summer day are not always an indicator that the plant needs more water. When in doubt, check the soil.

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PESTS AND DISEASES

Common pests associated with summer squash are aphids, spider mites, squash vine borers, and whiteflies. Planting nasturtium with zucchini reduces aphid problems,however, nasturtium seeds are slow to germinate and should be planted before the squash. Insecticidal soap may be used to control aphids, spider mites, and whiteflies, but be sure to dilute the spray and refrain from spraying in the heat of the day because squash leaves may burn easily. It is wise to test a few leaves first before spraying the entire plant. And don't forget the undersides of leaves, where spider mites and whiteflies are usually found. To control squash vine borers, spray the base of stems once a week with Bacillus thuringiensis var. kurstaki.

Common diseases include bacterial wilt, downy mildew, powdery mildew, and viruses. In the case of bacterial wilt, leaves begin to die. Cut the wilted stem and touch the tip of your knife to the sap. If it is milky and sticky, your plant is infected. Destroy infected plants immediately. Bacterial wilt, mildews and most viruses can be controlled or prevented with good cultural practices. Inspect plants often and control insect pests that can spread disease. Keep the garden clean and free of weeds and debris. Mildews can be reduced or prevented with proper watering and good air circulation.

HARVESTING

For the tenderest produce harvest zucchini at their immature stage when the rind is soft and seeds are underdeveloped. Fruits should be 6 to 8 inches long and 1 1/2 to 3 inches in diameter. Some varieties may be edible at even larger sizes. Delayed harvest results in further development of the fruit, causing toughness of the rind and hardening of the seed, contributing to loss of quality. It is important to keep zucchini picked, or fruit production slows. On the other hand, if you have so much zucchini that even the neighbors have had enough, leave one or two fruits on the plant to slow it down.

Be sure to cut the fruit from the plant at the stem between the fruit and the main stem. Attempting to pull zucchini off the plant will usually damage the entire plant.

For edible flowers, harvest early in the morning before they close, place them with their bases in water, and store in the fridge until you're ready to use them.

STORAGE

Although zucchini is best eaten when fresh, it can be canned or frozen. Freshly harvested produce can be refrigerated up to 2 weeks.

To Freeze: Shred unpeeled zucchini. Drain in a colander, and then pat dry with paper towel applying pressure to remove as much moisture as possible. Place 1 or 2 cups of zucchini in freezer bags and seal tightly. Frozen zucchini lasts about 3 months.

NUTRITIONAL VALUE

All summer squash are a rich source of nutrients, especially the natural antioxidants beta-carotene, folic acid, and vitamins C and E. They contain healthful minerals including potassium, iron,calcium, magnesium, phosphate,copper, and zinc. Research has shown that squash seeds also contain traces of cancer-preventing substances, known as protease trypsin inhibitors, which inhibit activation of viruses and carcinogens in the digestive tract. One-half cup of boiled zucchini has only 18 calories, 0.3 grams of fat, and 1.0 mg of sodium. Each half-cup serving provides 0.8 grams of protein, 3.9 grams of carbohydrate, and 1.3 grams of dietary fiber.

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Zucchini: Favorite Recipes

There are hundreds of recipes for zucchini - maybe thousands! And keep in mind that the flowers are edible, too. Go online, and you'll be surprised how many sites are dedicated to zuke recipes! Here are a few favorites.

ZUCCHINI RICOTTA GNOCCHI (MY FAVORITE!)

1 1/2 pounds zucchini
2 tablespoons kosher salt
1 1/2 cups ricotta cheese
1 egg yolk
1/2 cup Parmesan
1 teaspoon salt
1/2 teaspoon pepper
1 1/2 cups flour
2 tablespoons fresh basil, chopped
Melted butter (optional)
Fresh homemade tomato-basil sauce

Grate zucchini, place in colander and toss with kosher salt. Drain for 20 minutes.Wrap in cheesecloth and squeeze tightly to remove as much liquid as you can. Combine zucchini with ricotta, egg, Parmesan, salt and pepper. Mix well. Add flour, mixing gently, so dough is not overworked. Let mixture chill in refrigerator for 20 to 30 minutes. Boil a large pot of water. Divide dough into 3 or 4 workable sections. Work on a floured surface to roll dough into ropes about 1 inch thick. Cut ropes at 1-inch intervals.Drop gnocchi in the boiling water, stir gently and boil for 1 or 2 minutes after they rise to the surface. Remove with a slotted spoon and drain in colander. Gently toss the drained gnocchi in melted butter then top with homemade tomato-basil sauce or marinara sauce.

ZUCCHINI PARMESAN BREAD

3 cups flour
1 cup zucchini, peeled & shredded
1/3 cup sugar
3 tablespoons grated Parmesan cheese
1/2 teaspoon baking soda
1 teaspoon baking powder
1 teaspoon salt
1/3 cup butter
1 cup buttermilk
2 eggs
1 tablespoon grated onion

Preheat oven to 350 degrees Fahrenheit. Grease and flour a loaf pan. Mix flour, zucchini, sugar, cheese, baking soda, baking powder and salt together in mixing bowl. Melt butter; stir in buttermilk; then remove from heat. Beat eggs in separate bowl, add buttermilk mixture and onion; stir into flour mixture and mix well to form thick batter. Spread batter into well greased and floured loaf pan. Bake for 1 hour.

BATTER-FRIED ZUCCHINI BLOSSOMS

Approx. 18-20 zucchini blossoms (picked just before they open)
1/2 cup milk
1 tablespoon flour
1/2 teaspoon salt
Pinch ground pepper
1/2 cup canola oil

Mix milk, flour, salt, and pepper. Set blossoms in shallow dish and pour mixture gently over top. Heat oil in a large skillet. (Oil is ready when a drop of water sizzles). Carefully transfer blossoms from the batter to the hot oil and fry until golden brown. Remove from oil and drain on paper towel. Sprinkle lightly with Creole Seasoning.

ZUCCHINI PANCAKES

1 cup zucchini, grated and drained
1 egg
1 cup flour
1 teaspoon baking powder
3 tablespoons grated Parmesan cheese
1 minced garlic clove
Salt and pepper
Olive oil

Mix eggs and milk. Add dry ingredients to make batter. Add zucchini. Heat small amount of oil in frying pan or griddle. Cook batter like pancakes until golden brown. Makes about 10 (when dropped by tablespoon).

ZUCCHINI PARMESAN

7 small zucchini, ends trimmed, cut lengthwise into 1/4-inch slices
Salt, to taste
3 large eggs
1 cup all-purpose flour
Vegetable oil
4 ounces Parmesan cheese
5 ounces mozzarella cheese
Tomato Sauce

Preheat the oven to 425 degrees Fahrenheit. Sprinkle zucchini slices with salt and drain them in a colander for 20 minutes. Pat dry with paper towels. Beat the eggs. Dip the zucchini slices in flour, then in the beaten eggs. Cook in very hot oil about 1 1/2 minutes on each side. Drain on paper towels. Shred two-thirds of the mozzarella. Reserve. Cut the remaining mozzarella into 6 equal slices. Layer one-third of the fried zucchini followed by one-third of the tomato sauce in a buttered casserole dish. Sprinkle with one-third of the Parmesan and the shredded mozzarella cheeses. Repeat twice. Top with the sliced mozzarella. Bake in the preheated oven for 15 minutes. Cool 10 minutes. ■

National Garden Bureau Introduces New Flowers & Vegetables

The National Garden Bureau is a consortium of over twenty-five growers of flowers and vegetables that produce many of the new seeds and plants that are sold to home and farm growers each year. These companies either grow the plants in their own fields, or contract producers to supply them. Seeds are harvested and made available to the public through seed catalogs, or in seed packets offered through retail stores and nurseries.

Each year, horticulturists and bureau members grow new varieties of flowers and vegetables in trial gardens, looking for new flower colors and shapes or vegetables with improved flavor and other desirable qualities. The goal is to compile the results from the trial gardens, decide on the year's winning plants, and then grow enough of them to present their seeds as All America selections.

In 2003, twelve new plants are being presented to the public. Nine are flowers, one is an ornamental grass, one is a super sweet melon, and one is a zucchini-type squash. All twelve of the plants will grow in our desert valley. We can choose them for our gardens by buying and planting the seeds, or by locating transplants at valley nurseries.

Two petunias are listed. Their names are 'Blue Wave' and 'Merlin Blue Morn.'

A dianthus 'Corona Cherry Magic' is a unique petite plant with 2- to 3-inch single flowers in a mosaic of colors that may be striped or flecked with other colors. This plant is said to have an exceptional garden performance, tolerating hot temperatures. It is a good choice as a winter-flowering annual. It needs fertile soil and a sunny position, and is recommended for patio containers and window boxes.

Photography: Candice Sherrill

A new vinca, 'Jalo Dark Red' extends the colors available in this popular summer flowering plant.

An unusual "Triple A" selection is an ornamental millet called 'Purple Majesty.' It is the first ornamental millet ever offered as a garden plant, and is so highly regarded by Bureau judges as to win a Gold Medal award. It is a plant that commands attention, 3 to 5 feet tall with purple leaves and spikes that become purple as the seeds mature. It needs warm soil and ample space (about 2 feet apart) to grow. Immature spikes make lovely floral arrangements. Birds will harvest mature seeds.

by Evelyn Helm, Master Gardener

Other flowers included in the 2003 AAS winners are Agastache 'Golden Jubilee,' Gaillardia 'Sundance,' Rudbeckia 'Prairie Sun,' Carnation 'Can Can Scarlet, and ' Eustoma 'Forever White.' The vegetables are Melon 'Angel,' and Squash 'Papaya Pear.'

Seeds of these plants are offered by a number of seed catalogs, but the one that lists them all is Park Seeds, PO Box 46, Greenwood, SC 29648-9982. Their catalog is free. ■

Photography: Candice Sherrill

WORD WISE

Definitions for terms used in this issue…

aquifers (Beetle FAQs) p.8)—water-bearing strata of permeable rock, sand, or gravel.

brood (Beetle Outbreak p.6)—the young of an animal or insect, hatched and cared for at the same time.

carbohydrate (Beetle Outbreak p.6)—any of various neutral compounds of carbon, hydrogen, and oxygen (as sugars, starches, and celluloses) most of which are formed by green plants and which constitute a major class of animal foods.

complimentary (Color Palette p.10)—exhibiting favor or esteem; not clashing.

deciduous (Ask a Gardener p.19)—falling off, as leaves from a tree; not evergreen; not persistent.

floodplains (May Monsoon p.21)—level land that may be submerged by floodwaters. Plains built up by stream deposits.

forbs (Beetle FAQs p.8)—fodders or foods; herbs other than grass.

galleries (Beetle FAQs p.8)—passages made in wood by insects.

monochromatic (Color Palette p.10)—of a single color; exhibiting different tones of the same color, as whites.

pandemic (Beetle FAQs p.8)—occurring over a wide geographic area and affecting a high proportion of the population.

permethrin (Beetle Outbreak p.6)—a synthetic pyrethrin (pyrethrins are oily liquid esters having insecticidal properties and occurring in the flowers of pyrethrum) used as an insecticide.

phloem (Beetle FAQs p.8)—the food conducting tissue of vascular plants; bark.

predacious (Beetle FAQs p.8)—living by preying on other animals.

resin (Beetle Outbreak p.6)—a sticky organic substance (usually transparent or translucent and flammable) formed in plant secretions, and insoluble in water.

slash (Beetle Outbreak p.6)—debris, as from logging; an open tract in a forest strewn with such debris.

systemics (Beetle Outbreak p.6)—pesticides that, as used, are harmless to the plant or higher animal, but when absorbed into the sap makes the entire organism toxic to pests.

translocated (Beetle FAQs p.8)—displaced; the conduction of soluble material from one part of a plant to another.

transpiration (Summer Tree Care p.17)—the act of giving off or exuding water vapor from a living body through a membrane or pores, especially of leaves.

volatile (Beetle FAQs p.8)—characterized by or subject to unexpected change; readily vaporizable at a relatively low temperature.

watersheds (Beetle FAQs p.8)—regions bounded peripherally and draining ultimately to a particular watercourse of body of water.

xylem (Beetle FAQs p.8)—the water conducting tissue of vascular plants.

Ocotillo: Fiery Beauty

Photography: Candice Sherrill

by Evelyn Helm, Master Gardener

BOTANICAL NAME:
Foquieria splendens

COMMON NAME:
Ocotillo, coachwhip, candlewood

Is my ocotillo alive? It's a question that desert newcomers, having never seen such an odd-looking plant before, frequently ask. There it stands in their garden, without a leaf—a cluster of spiny stems seemingly bereft of life. But then we get a little rainfall and the nights turn warmer, and suddenly that drab, once-skeletal eyesore blazes with color.

The ocotillo belongs to the genus Fouquieria, of which there are only a few species in the world. One is native to the United States, found mostly on rocky hillsides below 5,000 feet from western Texas to southern California. It also jumps over the border into Mexico where two related species grow: the Mexican tree ocotillo and the bizarre Boojum tree.

Ocotillo provides a strong vertical element in the garden. It serves as a good foil in a cluster of cacti, its spare branches contrasting interestingly against their generally more rounded forms. Each plant is made up of many narrow, nearly straight spiny branches springing from the ground. There are few stems, and the braches often grow to 10 or 15 feet.

If grown from seed, ocotillos grow very slowly. A 5-foot plant requires ten years or more to be marketable. Most ocotillos sold for landscape use are collected from the wild, and deserve some protection to keep them from becoming scarce in our native landscapes.

Illustration: Donna Atwood

Ocotillos respond quickly to changes in weather. After a rain leaves sprout above each spine, and the plant turns a lush green color. But the leaves often drop again as soon as a dry spell sets in. In the spring, the long stems are capped with brilliant red flags made up of multiple flowers that attract hummingbirds. During a wet season rapid growth may occur, lengthening the stems dramatically.

Ocotillos require full sun and excellent drainage. They may be watered sparingly, but are prone to rot in heavy, wet soils. Most people consider it best to leave them alone. They are hardy to 10 degrees Fahrenheit.

In Mexico, the tree form of our familiar ocotillo has thicker main stems and is more commonly branched. It grows rapidly from seed, and will bloom in two or three years, sometimes when only a few feet tall. In Arizona's low desert, the tree form needs some sun protection. It is also tender to frost. It does well in large containers.

The Boojum tree, another relative, is one of the strangest plants on earth. It resembles an upside-down carrot. Its single, erect trunk has many spiny side branches. In the wild, it grows only in Baja, California and in a small area in Mexico. It is legally protected and cannot be exported. It can be grown from seed if a source can be found. It grows very slowly, requiring over ten years to reach a foot in height. It makes a fun container plant in full sun, and will eventually attain a height of 15 feet.

So the answer is yes, your ocotillo is alive. Keep your eye on it, and before long you'll see for yourself why this plant is so well loved here in the Southwest. ■

May Monsoon Prep

by Mike Mekelburg, Master Gardener

Now is a good time to think about the damage that severe monsoon winds can wreak in your landscape come July and August.

Disproportionately thick tree canopies—typically found on mesquite, ficus, and just about any type of tree that has been improperly pruned over the years—should be thinned out well before monsoon winds start whipping up. You'll need to limit pruning after the hot summer months arrive, since newly exposed bark is susceptible to sunburn.

Widespread anchor roots are also important for tree stability. This is something that cannot be put off until just before monsoon season. Regular watering under the tree's canopy drip line is the best way to promote good anchoring. Instead of placing a hose at the base of the tree's trunk and letting it trickle for an hour or so, move the hose around under the canopy's drip line at the three, six, nine, and twelve o'clock positions, letting it soak two hours in each position. Or build a soil berm at the drip line, so the entire basin under the tree can be flooded for two hours. Underground irrigation systems are also a good bet.

For yards that are in floodplains, it's a good idea to choose larger"curb rock" for the strip between the sidewalk and the curb so water won't wash away so easily.

In other news, citrus are due for their second feeding of the year about mid-month. Nitrogen is the crucial ingredient, with iron, sulfur, and manganese being helpful. Follow label directions for application rates.

Enjoy the May sights of swallowtail butterflies around citrus trees, and the beautiful blooms on saguaro and prickly pear cacti. ■

Ask a Gardener

by Judy Curtis, Master Gardener

How Do I Care for My Ocotillo?

We often receive calls at the Master Gardener desk asking how to care for a recently transplanted ocotillo.

New ocotillo owners should know that while the plant is not a true cactus, it is a stem succulent, meaning it stores moisture between rainfalls. In order to conserve that moisture, it leafs out briefly after wet weather and then goes deciduous until the next storm. Spraying the plant in an effort to keep it green longer interferes with its natural growth pattern and is not recommended.

Because much of the root system is destroyed when ocotillos are removed from the desert, it can take up to 2 years for a transplant to establish itself well enough to begin putting out leaves. During the first summer (June through September), a monthly deep watering in a wide 3- to 4-foot band around the base can help encourage root growth. After that, normal rainfall is adequate.

As for pruning—we cringe at the thought. Cutting the canes back will destroy the tips where the bright orange blooms appear in spring. This kind of pruning will also result in spindly, tangled growth from the cut ends of branches, ruining the regal, vertical shape of the plant.

Bringing desert natives into your landscape is rather like inviting houseguests. Just as you make an effort to discover the likes and needs of your friends in order to be a good host, take the time to learn the habits of these unique plants and they will reward you with years of satisfaction. ■

Summer Tree Care: a Life or Death Issue

by Lenora Stewart, Master Gardener & Certified Arborist

Proper summer care can be a life and death issue for trees in the low desert. Native trees are "built for the desert," with genes that contain information making it possible for them to withstand drought. Some trees native to other deserts and regions also have strategies that make it possible to survive here under adverse conditions. However other, non-native trees are simply ill suited to our area, and are therefore prone to problems. So when choosing a tree, it's important to know something about its needs.

At the present time we are experiencing a drought. This means that you will need to provide water to insure that your trees have enough moisture stored in their leaves, branches, trunks, and roots to sustain them during the summer months, when they are is growing and expanding, and transpiration is occurring. Otherwise, trees can be thrown into stress. Then if further stresses occur, on top of those caused by drought, the health of the tree can be compromised.

One thing that can really stress a tree is pruning. Regular pruning is NOT necessary. Keep in mind that trees grow and produce leaves and branches for a reason. I'm not saying that it is NEVER necessary to prune, but too often pruning done for the wrong reasons. If you prune to keep a huge tree small, perhaps you planted the wrong tree. Or it could be that you are overwatering and overfertilizing, causing the tree to grow too big too fast.

Pruning during the summer deprives the tree of leaf area that it uses for shade as well as food production. There are many trees that have been thinned and pruned to the point that they provide no shade—even to themselves! That kind of excessive pruning exposes the tree's bark to intense and massive amounts of sun. Just as you would sunburn if you stood out in the sun all day without proper covering, so does the tree!

Heat is an issue in itself. Decomposed granite under or around trees absorbs and then reflects the heat and sun. This makes it even more intense! Block walls, glass, structures, and water surfaces all reflect and/or absorb heat, and can stress nearby trees!

In order for trees to have enough water, don't wait until the tree is dying to water it. Water deeply but infrequently all year. During the winter you can water less often, but water deeply far enough out from the trunk to get water to the entire root system. Remember: the largest percentage of the roots are at the drip line. Watering once every 4 weeks during the winter may be enough. During the summer, the same tree may need to be watered every 7 days or so. A drip system with one or two emitters next to the trunk of the tree that comes on every other day for 30 minutes is okay when the tree is newly planted, but watering should be reevaluated once the tree has been in the ground for a month or two. After that, assess and adjust the watering every few months.

Another important consideration is how trees are staked and tied. It is not always necessary to stake and tie newly

Photography: Candice Sherrill

planted trees! If it is necessary (to keep the tree from falling over), do so with the idea that as soon as possible stakes and ties should be removed. Many, many times they are installed and never checked again! The ties become tight around the trunk of the tree, cutting off much of the life-giving fluids that flow up and down the vascular system just below the bark.

So, be aware of your trees during the summer. Keep in mind that it is extremely hot out there, and there are many ways that trees are stressed. Since trees grow more rapidly during summer months and ties can become tight and strangle the tree, check those stakes and ties frequently. Make sure that your trees get nice LONG drinks when they get water. And especially during the summer, resist the urge to prune—AT ALL! Think like a tree! ■

Nature's Mimics

by Kris Lecakes-Haley, Master Gardener Intern

We frequently marvel at the beautiful manifestation of nature evidenced by our trees, plants and flowers, but were you aware of the many creatures that mimic those plants? That's right…creatures!

One example is the Dead Leaf Mantis. It perfectly exemplifies its name by looking exactly like a dead, dry, brown leaf. And although tiny, it is fierce, frightening away enemies by surprising them with a sudden and unexpected unfolding of its wings…considerably increasing its size. Then there is the Leaf Insect, among nature's most amazing artists of imitation. Its flat veined body looks almost exactly like a smooth-edged netted leaf, or at least what that leaf might look like after a brief encounter with leaf cutter ants. Its color slowly changes with age, from vibrant to dull green and finally to brown.

Stick Insects, which mimic their namesake, look just like… you guessed it… sticks or branches. Long and brown, with legs that look like twiggy off-

shoots from the main branch, they grow to over a foot in length, making them the longest insect in the world! Another family member, green in color, is called the Thorny Stick Insect, with threatening spikes covering its body to keep enemies at bay. Reportedly, even wild animals such as monkeys have been known to avoid this spiky little fellow.

Finally, there are the Flower Mantids and the Orchid Mantids. Flower mantids assume the appearance of the flowers upon which they live. They prey on small insects that innocently alight, thinking they are safely perched on a flower. Within seconds the insects find themselves in the clutches of the mantid's very powerful front legs (which resemble beautiful flower petals), on their way to becoming a quick meal. The similar body of the orchid mantis mimics the appearance of the center of an orchid, making it just as alluring to passing insects.

Photography: Mark Watson

Studying such remarkable creatures as these yields both fascinating and useful information. Next time you're about to pick up that twig, or pluck that gorgeous orchid…if it moves…watch your fingers! ■

Source:
Ling, Judy. *Incredible Insects.*

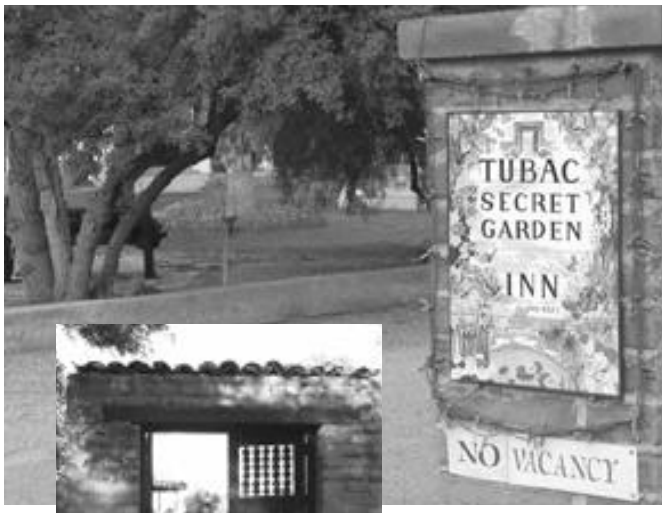
Inspecting Your Irrigation System

by Donna DiFrancesco, Water Conservation Specialist, City of Mesa

As gardeners, we know how important water is for our plants. But, we are also aware of how important it is to use water wisely in our desert environment. You can water effectively but still save a lot water and money by periodically checking your irrigation system. To make your job easier, follow this checklist. Monitor your system while it is in operation and check off each item when completed.

- If you have an automatic timer or irrigation controller, check that the controller program is correct.
- Check for leaks through the entire system. Look for standing water, soggy ground, and eroded soil.
- If the controller has battery backup power, replace the battery yearly.
- Replace missing or broken sprinklers, bubbler heads or drip emitters.
- Move emitters out to the drip line as plants grow, or increase basin sizes for bubblers.
- Set sprinkler heads at the proper height to prevent them from becoming blocked or submerged by grass and other surrounding plants.They should also be straight with the soil surface, not tilted.
- Be sure your system is watering only the areas intended, with no water running onto walks, into streets or down the gutter.
- If you have a sloped yard and have water runoff, then split the watering schedule. Water for half the calculated time and repeat after one hour. ■

Tubac Secret Garden Inn



Photography: Linda A. Guy

You've got to love a place that sends a packet of homegrown wildflower seeds with its room confirmation. Tubac Secret Garden Inn is a self-described Spanish colonial bed and breakfast secluded on roughly three acres in the Old Town sector of Tubac, near the Presidio historic park and St. Ann's church. We were close enough to visit the entire town on foot, nicely shielded from road dust or the noise of fellow weekend visitors.

Retired from teaching in 1981, Seattle-area residents Don and Leila Pearsall felt the need to "chase the sun." Touring through Tubac, they found one particular For Sale sign irresistible. It was to be a local version of Sedona's Tlaquepaque, but the builders had barely managed to construct a gazebo and a single building (sales office with several individual model offices) before their cash was exhausted. The Pearsalls had discovered their retirement home in a failed commercial development!

These separate units would eventually become the basis for the bed and breakfast.

For many years, the acreage was the couple's creative playground. They had fun "just pooping around" (one of Leila's favorite expressions), adding hardscape and plantings as it suited them. Leila loves rocks, and the two regularly hauled them from the countryside for various projects. When we visited, she was deploying her current inventory into a channel to divert runoff from the town's building boom. Curious about adobe brick construction, they dug, formed and dried clay onsite. Adobe walls delineating outdoor 'rooms' and even an outside bread oven were built.

Statuary created by an artist acquaintance was added to a water feature and the garden itself. A swimming pool was turned into a rather large koi pond spanned by a bright blue bridge. A service shed was built as an excuse to display Leila's stained glass windows, which are also in evidence on an old bunkhouse adjacent to the guestrooms.

Because Tubac is in the Santa Cruz River valley at an elevation of some 3,680 feet, most of the Inn's vegetation was still in winter dormancy during our mid-February visit. Notable exceptions were stretches of wildflowers and a patch of sweet violets blooming in a shady wet corner. (Drifts of violets also grew in the Tumacacori mission garden a few miles south). Nonetheless, the garden's warm weather potential was evident in its structure. A large shaded walkway is covered in Lady Bank's roses, while another arbor is covered in wisteria. Our private patio was bordered with a magnificent Queen's Wreath bower. There was also an amazing compost pile that looked to be half a city block in length!

Leila single-handedly maintains the gardens, no small chore since Don passed away two years ago. Thinking of all the work she does, I was reminded of our annual garden tour theme 'Real Gardens for Real People.' There is no fulltime maintenance staff to disturb her solitude.

Tubac is located 45 miles south of Tucson, 20 miles north of Nogales, and is replete with history. The oldest European settlement in what is now Arizona, it became part of the U.S. as part of the Gadsden Purchase. The original native settlement became a

by Linda A. Guy, Master Gardener

farm supporting the new mission in Tumacacori to the south. Eventually, a presidio was built to house a garrison when the natives revolted against the Spanish incursion. Guided tours of the Barrio de Tubac ruins, an archaeological preserve south of the state historic park are available on a limited basis and require advance reservations. Tubac is also on the Juan Bautista de Anza National Historic Trail reaching to San Francisco from Nogales.

Perhaps more widely known for its galleries and shops, Tubac's modest size makes it easy to browse in a day's time. But don't count on seeing it that quickly! Tubac's allure is the presence of the artists themselves, in the working studios that are often accessible from the galleries. We chatted with many of them, and consequently needed most of two days to see the village. Lingering over delicious meals in the handful of wonderful restaurants, or enjoying a coffee or glass of wine in our 'secret garden' further slowed our pace.

If my recommendation to visit Leila Pearsall's establishment is insufficient to tempt you, it might be interesting to note that a team from Sunset Magazine occupied the other room at the Inn. This novice writer was in good company, but alas I had no opportunity to hobnob with the pros.

The Tubac Secret Garden Inn is located at the end of Placita de Anza (#13), at the eastern end of town. Reservations are required (520.398.9371) with a two-night minimum—cash or checks only. The property can be viewed at http://www.tubacaz.com/secret_garden.htm. ■

Computer Corner

by Terry Tanner, Master Gardener

AMERICAN COLLEGE OF RHEUMATOLOGY
Log on to the ACR Web site to read fact sheets about various arthritis conditions. Click on "Find a Rheumatalogist" to locate an arthritis specialist in your area. www.rheumatology.org/patients/factsheets.html

ARTHRITIS FOUNDATION
The Arthritis Foundation Web site offers overviews of the different types of arthritis, as well as information about medicines, surgery, and other treatments. You can order informational brochures online or by calling the toll-free number. www.arthritis.org/conditions/default.asp

NATIONAL INSTITUTE OF ARTHRITIS AND MUSCULOSKELETAL AND SKIN DISEASES
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TAX HELP
The IRS has numerous publications on a variety of tax-related topics available by phone, fax or the Internet. Forms and publications are listed by number and then title. And there's a search feature you can use if you know the topic but not the number of the form or publication.
www.irs.gov

CHILDREN AND HERB GARDENING
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