

CENTRAL SPINE

July 2025



A painting by Dyana Hesson.

TREE *EUPHORBIAS* By Dr. Bob Webb

The July 26 meeting starts at 2 p.m. in Dorrance Hall at Desert Botanical Garden.
Come early to socialize and to bid on plants.

Tree *Euphorbias* as a group are poorly understood and rarely photographed. If one uses an arbitrary definition of a single-stemmed species with a height of 10 feet or more as a “tree,” then there are 107 species, give or take, that fall into this category. A few are New World, but the majority occur in Africa, the Arabian Peninsula and the Indian subcontinent. Because Arid Lands Greenhouses in Tucson has been in operation for 50 years, and once specialized in *Euphorbias*, we have perhaps 50 or more tree *Euphorbias* in cultivation. Dr. Webb’s travels in Africa and Arabia have captured images of more species, some of which have never been photographed before to our knowledge. This talk is a geographical and taxonomic tour of the region depicting many species of tree *Euphorbias* in habitat and cultivation.

Dr. Robert H. Webb is a retired hydrologist from the U.S. Geological Survey. He has been growing succulent plants and cacti for nearly 40 years, and has conducted research on plant ecology and conservation biology in the Southwestern United States for nearly as long. For the last 15 years, he has travelled extensively in Africa and the Arabian Peninsula looking for succulent plants. He and his wife, Toni, are the owners of [Arid Lands Greenhouses](#) in Tucson, Arizona. Dr. Webb is also the former chairman of the [International Sansevieria Society](#). He has described and named 15 species or subspecies of plants, including two *Agave* species from Baja California, Mexico, and 13 *Sansevieria* species or subspecies from East Africa, South Africa, India, and Somalia.



Left, *Euphorbia trigona* “Rubra” and right, *Euphorbia ingens* known as candelabra tree from Planet Desert.

BOOJUM TREES: FAST GROWTH, SHORT LIVES AND THE IMPACT OF STORMS By Tom Gatz

Do boojum trees really grow slowly and live for centuries? Early observations suggested that boojums grew only a few inches per year and that the tallest individuals might be as much as 700 years old. More recent research, however, paints a very different picture.



Club members Candy and Jerry Briney's boojum shortly after they purchased it from the DBG in March 2018.

According to Dr. Mark Dimmitt, boojums (*Fouquieria columnaris*) can grow 1-2 feet in a single wet year. In his account of the species in the 2015 edition of *Natural History of the Sonoran Desert* (Arizona-Sonora Desert Museum Press), he notes that repeat photography has dramatically revised our understanding of their longevity. "Moreover, repeat photography indicates that their lifespans are typically only a century or so. Of the boojums identified in photos taken at several sites in 1905, not one was still present when the sites were revisited in the 1990s. In those photos taken in the 1950s, very few were still present 40 years later."

Dr. Dimmitt attributes much of this mortality to tropical storms. He notes that "every few decades a given boojum population experiences a direct hit from a hurricane." Because of their tall, narrow form, boojums are especially vulnerable to high winds, and hurricanes can topple many of the largest specimens.

One notable exception is a giant boojum documented by Robert Humphrey in a sheltered canyon near Bahía de los Ángeles during the 1970s. At that time, it stood 81 feet tall. As of 2013, this champion tree was still alive despite Hurricane Nora, which toppled many large succulents in the region. The protected canyon also supports numerous other boojums exceeding 60 feet in height.

The oldest boojum at Desert Botanical Garden, located south of Webster Auditorium, was planted in 1939, making it almost 90 years old today. Since it was likely planted as a young plant, rather than a seedling, its actual age may be closer to 100 years. Sadly

—and somewhat ironically—a windstorm accompanied by heavy rain partially uprooted the tree this past year, causing it to lean. It is now supported by a metal brace.



The Briney boojum is now about 12 feet tall. They estimate it has grown approximately 11 feet in the 8 years since they planted it in their Peoria yard in 2018.

Boojum Care in Arizona

Several club members have reported that boojums grow surprisingly quickly in Phoenix gardens, particularly when provided with ample water during the winter growing season.

The key is to recognize that boojums are winter growers. They generally appreciate regular moisture from fall through spring, but should be kept relatively dry during their summer dormancy.

In Tucson, nurseryman Gene Joseph recommends watering potted plants weekly and in-ground plants every two weeks from September through May. During the summer dormant period, he advises withholding water entirely from plants in the ground and watering potted specimens only every two weeks. He also recommends monthly fertilization during the growing season to promote faster growth.

Using this regimen, Joseph has recorded growth rates of six inches or more per year for boojums planted in the ground in Tucson. By comparison, three boojums growing on the University of Arizona campus averaged only about three inches of annual growth between 1929 and 2006, although the amount of supplemental irrigation they received is unknown.

These observations suggest that boojums may grow considerably faster than once believed when provided with favorable conditions. At the same time, their vulnerability to hurricanes and windstorms indicates that even these iconic desert giants may live shorter lives than early observers imagined.



This ~90-year-old boojum at Desert Botanical Garden unfortunately began to lean after a wet and windy storm.

HYDROGEN: THE OVERLOOKED ESSENTIAL PLANT NUTRIENT

By Mary Crenshaw



When we discuss plant nutrients, the conversation usually centers on nitrogen, phosphorus, potassium, iron, or magnesium. Yet one of the most important plant nutrients is often overlooked entirely—hydrogen (H). Hydrogen is the “Clark Kent” of plant nutrients; it is quiet, unassuming and often unnoticed, yet absolutely essential to plant life.

An Essential Macronutrient Hiding in Plain Sight

In 1939, plant scientists Daniel I. Arnon and Perry R. Stout established the criteria used to determine whether an element is essential for plant growth. An element is considered essential if:

- The plant cannot complete its life cycle without it.
- No other element can substitute for its function.
- The element is directly involved in plant metabolism.¹

Hydrogen meets all three criteria. In fact, hydrogen is one of the most abundant elements in plant tissues and is classified as one of the three structural nutrients, along with carbon and oxygen.² and ⁶

Where Do Plants Get Hydrogen?

Unlike mineral nutrients such as calcium (Ca^{2+}), magnesium (Mg^{2+}) or potassium (K^+), plants obtain most of their hydrogen from water (H_2O) rather than from the soil.³

During photosynthesis, plants capture sunlight and use that energy to split water molecules in a process known as photolysis: $2\text{H}_2\text{O} \rightarrow 4\text{H}^+ + 4\text{e}^- + \text{O}_2$.

The oxygen gas (O_2) released during this reaction diffuses into the atmosphere.⁷

The hydrogen ions (H^+) and electrons (e^-) are retained and become critical components of the plant's energy producing and sugar building systems. Without this steady supply of hydrogen from water, photosynthesis would stop and plant growth would cease.

Hydrogen Helps Build Plant Food

Most succulent enthusiasts know that plants use carbon dioxide and water to make sugars during photosynthesis. What is often overlooked is that hydrogen provides many of the atoms needed to build those sugars.

Plants combine carbon dioxide (CO_2) from the atmosphere with hydrogen derived from water to produce glucose ($\text{C}_6\text{H}_{12}\text{O}_6$), the plant's primary energy rich carbohydrate.² and ⁶

Glucose serves several vital functions:

- It provides energy for growth and metabolism.
- It is converted into starch for storage.
- It forms cellulose, the primary structural component of plant cell walls.
- It serves as a building block for many other organic compounds.

In other words, hydrogen helps transform sunlight, water and carbon dioxide into the tissues that make up leaves, stems, roots, flowers, and fruit.

The Biological Dam Inside Every Plant

Hydrogen performs another remarkable function that is largely invisible to growers.

Inside chloroplasts and mitochondria, hydrogen ions (H^+) are pumped across membranes, creating a concentration gradient. This gradient functions much like water stored behind a dam.

As hydrogen ions flow back across the membrane through the enzyme ATP synthase, the stored energy is released and captured as ATP (adenosine triphosphate)—the molecule that powers nearly every biological process.⁷

ATP fuels:

- plant growth
- nutrient uptake
- root development
- flower and fruit production
- cellular repair and maintenance

A useful analogy is a hydroelectric dam: water stored behind the dam possesses potential energy, and when it flows through turbines, electricity is produced. Likewise, hydrogen ions (H^+) flowing through ATP synthase drives the production of ATP, which *is* the energy molecule that powers plant life. Without hydrogen, plants could not effectively capture and utilize energy from sunlight.

Hydrogen Supports Plant Structure and Water Relations

Hydrogen is also a major component of water itself, making it essential for maintaining plant hydration.

Water creates turgor pressure, the internal pressure that keeps plant cells firm and supports stems and leaves. When water becomes scarce, turgor pressure decreases and plants wilt. Hydrogen is therefore indirectly involved in maintaining plant structure and preventing wilting.

Why Isn't Hydrogen Listed on Fertilizer Bags?

Given its importance, many gardeners wonder why hydrogen is not included in fertilizer analyses. The answer is simple: plants obtain abundant hydrogen from water and do not normally experience hydrogen deficiencies.³ and ⁵

Unlike nitrogen, phosphorus, potassium, iron, or zinc, hydrogen does not need to be supplied as a fertilizer because nature already provides it continuously through water. For this reason, hydrogen, carbon and oxygen are classified as non-mineral essential nutrients, while fertilizer labels focus on nutrients that may be deficient in soils.³ and ⁵

The Takeaway

Hydrogen may never appear on a fertilizer bag, but it is one of the most important nutrients in plant biology. It helps plants:

- build sugars and carbohydrates
- form cellulose and plant tissues
- produce ATP through proton gradients
- maintain cellular hydration and turgor pressure
- complete their entire life cycle

The next time you water a plant, remember that you are not simply supplying moisture, you are also delivering one of the most essential nutrients in the plant kingdom: hydrogen.

References:

1. Barak P. *Essential Elements for Plant Growth*. Department of Soil Science, University of Wisconsin–Madison. Accessed June 19, 2026. <https://soilsfacstaff.cals.wisc.edu/facstaff/barak/soilscience326/essentl.htm>
2. Pennsylvania State University Extension *Hydroponics Systems and Principles of Plant Nutrition: Essential Nutrients, Function, Deficiency, and Excess*. Published 2025. Accessed June 19, 2026. <https://extension.psu.edu/hydroponics-systems-and-principles-of-plant-nutrition-essential-nutrients-function-deficiency-and-excess>
3. University of Minnesota Extension *Quick Guide to Fertilizing Plants*. Accessed June 19, 2026. <https://extension.umn.edu/manage-soil-nutrients/quick-guide-fertilizing-plants>
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5. Cornell University *Essential Elements for Plant Nutrition*. Accessed June 19, 2026. <https://courses2.cit.cornell.edu/cca/soilFertilityCA/CA1/CA12.html>
6. Alberts B., Johnson, A. Lewis, J. Raff, M. Roberts, K., and Walter, P., *Molecular Biology of the Cell*. Fourth edition. Garland Science; 2002. Chapter: Chloroplasts and Photosynthesis. National Center for Biotechnology Information Bookshelf. Accessed June 20, 2026. <https://www.ncbi.nlm.nih.gov/books/NBK26819/>

AWARD-WINNING PLANT: *STENOCEREUS HYSTRIX*

AWARD: Judge's Choice Award of the 2026 Show (Mich Pillet)

GROWER: Tristan J. Davis

PLANT NAME: *Stenocereus hystrix*

PURCHASED: Obtained in 2021

POT: Brooke Sykes

FERTILIZER: I use Superthrive Bloom Liquid Plant Food (3-12-6).

POTTING MEDIUM: It's in 50% pre-made cactus and succulent mix and 50% small pumice.

SUN EXPOSURE: It grows under 40% shade cloth.

WATERING: Watered every two weeks in summer.

FROST PROTECTION: None

OTHER NEEDS/COMMENTS:

This plant was originally received as a seven-inch rooted cutting in very bad shape including a damaged growing tip. Over time, it worsened, but it started a small pup at the base. The original plant kept worsening, so I cut the pup off when it was about two inches long and rooted it. The original plant died, but the cut pup grew well into the plant you currently see.



PLANT CARE INDEX By Editor Sue Hakala

With the summer heat upon us, and with us all spending more time indoors, it's a good time to take a look at some articles about caring for your plants in the summer. The best thing about this information is that it is written by people who live here and grow plants in the Valley.

Go to the club website at centralarizonacactus.org. Then click on the Newsletters tab at the top. Scroll down until you get to Plant Care Index 1975-2024. You'll find information on shade cloth, basic watering guidelines, grafting, providing shade for cactus and succulents, summer watering, what plants can grow in the full sun, and so much more.

Below is just a sample of what you can find. Just click on the weblink below (the underlined part) and go directly to the newsletter with the article in it.

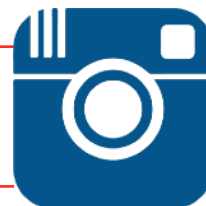
- [Breath In. Breath Out.](#) by Wayne MacDonald, 7/21, page 5
- [Feed Me](#) by Eric Lundberg, 11/19, page 12
- [How to Treat a Newly Acquired Plant](#) by Leo Martin, 8/02, page 3
- [Know Your Plants' Native Climate](#) by Doug Dawson, 1/09, page 7
- [Plant Exposure](#) by Chris Ginkel, 5/19, page 3

CACTUS FACTS

- The cactus family has 130 genera.
- There are 1,400-1,900 species.
- Thirty percent of cactus are threatened.
- Between 2050 and 2070, it is expected that there will be a 60% reduction in cactus overall.
- Desert Botanical Garden has 15,476 accessioned plants containing more than two-thirds of all cactus.



Be sure to visit CACSS on the web at: centralarizonacactus.org,
Facebook, Instagram and YouTube at: [CentralArizonaCactus](#), and
members only at: [CentralArizonaCactus Swap and Shop](#).



AWARD-WINNING PLANT: *ALOE CASTILLONIAE*

AWARD: Best Novice *Aloe*, Best *Aloe* of the 2026 Show

GROWER: Tammie Jansen

PLANT NAME: *Aloe castilloniae*



PURCHASED: I think it was purchased at the CACSS Annual Plant Sale in 2022.

POT: It's in a Mark Muradian pot bought at a monthly CACSS meeting.

FERTILIZER: I use a diluted cactus fertilizer applied once a month from March to June.

POTTING MEDIUM: It's grown in a cactus mix, pumice and gravel.

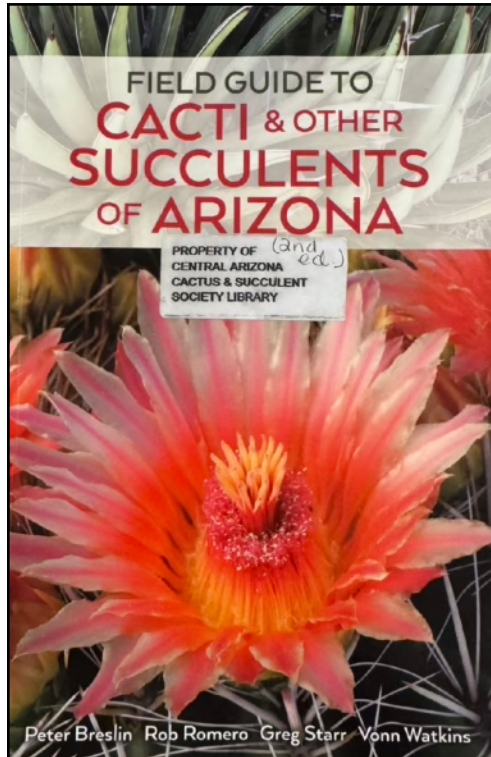
SUN EXPOSURE: It's grown under a back porch with a pergola, where it gets bright filtered light most of the day and some late afternoon direct sun.

WATERING: It's watered once a week during summer, and every two weeks spring and fall but less often in winter.

FROST PROTECTION: It gets just the porch overhang.

OTHER NEED,S/COMMENTS: It survived the plant stand falling over just after the 2025 Show and Sale with not even a scratch to the pot! I brought it in the house, rinsed the entire plant and watered it two days prior to the show. Its color got more vibrant.

FIELD GUIDE TO CACTI & OTHER SUCCULENTS OF ARIZONA By Peter Breslin, Rob Romero, Greg Starr, and Vonn Watkins Reviewed by Sylvia Lee



This is a book put together by the Tucson Cactus and Succulent Society. The first chapter tells the history of the organization. Do you remember that Lee Brownson talked about there having been a group of the Phoenix CACSS, during his tenure as president, that was established to “rescue native plants that would otherwise be destroyed by development?” Tucson CASS developed just such a group in 1999 that still existed when this book was published in 2017. Like Lee Brownson, I wonder if there are people in CACSS who are interested in resurrecting a group to rescue native plants. Included in this book are plants that need to be rescued as human development marches across Arizona’s drylands and deserts.

The book starts with pages called “Plant Morphology” where the authors have sketched and labeled the representative parts of cacti and their flowers. That is followed by pages giving descriptions of every genus of cactus that is native to Arizona. The information includes how and

where the genus names were derived (which happens to interest me more than some of the other information).

Did you know *cardo* is Spanish for “thistle?” Thus *Cardón* means “large thistle” I can see you checking your Spanish-to-English dictionaries.

Morphology is followed by a section titled “Species Accounts.” No, not expenditure accounts to maintain each species, but good information about each separate species. Again, there are explanations of how names came about and specific descriptions of plants. For each species there is a map of Arizona with a circle with wavy edges indicating where the species can be seen in the wild. There are good pictures of each cactus and of its flowers.

The last paragraph of each separate species piece in Morphology is titled “Notes.” All the notes are interesting and some are unusual. I liked the way useful information was given by use of the phrase “rather shy to flower in a pot.” A note about one species says, “It has been shown that jackrabbits are one of the primary vectors of seed dispersal.” Did you know some species grow less lethal with age? The note for a different species says, “The spines can be missing as the fruit ages.” There is a cactus that “survives in some of the driest areas of Arizona where rainfall is at an absolute

minimum throughout each year.” At least one succulent has sap so poisonous that natives used it to poison the tips of their arrows.

Back to a more serious thought, when the species have several varieties, the identifying characteristics of each variety are described in the “Notes.”

There is other good information, such as a page titled “Native Plant Protection” which goes into the legality of removing (or penalty for removing) cacti from their native habitats.

Readers will find this book to be an excellent reference to study when trying to identify species in their own collections or in the wild. It’s also a good book for people banding together to work to save native species.



Mammillaria bocasana 'Fred' crest by Robin Parry.

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AWARD-WINNING PLANT: *FEROCACTUS CYLINDRACEUS*

AWARD: Best Ferocactus of the 2026 show

GROWER: Sue Hakala



PLANT NAME: *Ferocactus cylindraceus*

PURCHASED: I bought it in 2012 when it was the size of my cupped hand.

POT: I grow it in a clay pot.

FERTILIZER: I use Miracle-Gro Rose Food at one-half strength every third watering.

POTTING MEDIUM: It's in 50% cactus and succulent mix from Ace Hardware and 50% pumice. For big pots, like this one, I add another handful of pumice to help it dry out fast.

SUN EXPOSURE: It gets full sun until 1 p.m., then

50% shade cloth in the summer months. It gets full sun all winter.

WATERING: I water once a week in summer, none in cold months. I water every third time with acidified water (1 tbsp. white vinegar in 5 gallons water with the fertilizer).

FROST PROTECTION: It goes into my heated plant house for the winter.

OTHER NEEDS/COMMENTS: I find that all my *Ferocactus* appreciate some afternoon filtered shade or shade cloth on the southwest/west side. When I walk in the desert I've noticed that all of the plants have a bush on the west side or a remnant of one from when they were younger.

TREE CARE By Desert Botanical Garden

No these plants aren't cactus and succulents, but they provide much needed shade for our plants. Here's what DBG advises.

There are no two ways about it. Poorly-groomed trees can damage your home and landscape during severe summer storms. Strong winds can uproot trees, break branches and even crack the tree trunk. Here are 10 tips to keep your trees upright.

1. Do not plant trees deeply.
2. Remove excess soil from the top of the root ball to expose the top of the main root system. This will be the height of the hole depth.
3. Examine the root system before planting and remove any root defects such as circling roots.
4. Stake only if necessary. If staking is needed, follow proper staking guidelines and remove the stakes after a year.
5. Water deep and wide to encourage a deep and wide root system.
6. Develop a pruning program for training a young tree to improve structure and increase longevity.
7. A pruning plan should be created to remove as little as possible. Never remove more than 25% in a given year.
8. Do not top trees. This creates weak branch attachments and can cause branch failure and breakage.
9. Remove dead or diseased branches. This can be done any time of year and especially before a storm.

AWARD-WINNING PLANT: *UNCARINA ROEOESLIANA*



AWARD: Best Advanced Succulent of the 2026 Show

GROWER: Jacob Gibbons

PLANT NAME: *Uncarina roeoesliana*

PURCHASED: The plant was purchased from Green Touch Nursery through the Palmstreet app in summer 2025.

POT: The pot was made in China and purchased through the Palmstreet app from AverytheCraft.

FERTILIZER: The only fertilizer this plant receives is a cup full of water from our small fish pond every couple of weeks.

POTTING MEDIUM: I use a very mineral based substrate made of 70-80% non organics including traditional pumice, Kanuma and Akadama. The organic component is a mix of cactus soil, usually Unigrow or Kellogg's Cactus Mix and worm castings.

SUN EXPOSURE: This plant lives in a spot in my yard where it receives full unfiltered sun all day.

WATERING: Watering is done every chance I get in the summer, which varies from 1-5 times a week.

FROST PROTECTION: Frost is of minimal concern in my area, but in the event of winter storms, I will wrap my plants in a combination of old sheets and plastic to insulate and also keep out rain.

PTEROCACTUS FISCHERI By Elton Roberts

There seem to be a lot of people out there in cactus land that do not like *Pterocactus* because they are *Opuntias*. I saw this forty years ago, and it is still the same today. When asked why, it is always the same answer, "I hate the glochids." I have most species of *Pterocactus* and very seldom do I get glochids in my hands. It is not like they are a meter tall and covering an area of twenty meters in diameter, and if that was the case, I would not like them either.



Left, photo 1 and right, photo 2

I use that as an example because I have seen patches of padded *Opuntia* on railroad land and along Interstate 5 that size and larger. That was over forty years ago, I wonder how large those patches are today. As for *Pterocactus*, from what I read, they never make a plant any larger than a clump 15 to 20 cm in diameter and that's for plants in cultivation. The plants that a lot of people have grow stems, flower terminally, set seed pods and then, after the seed is blown away, the stems die off and everything is gone till the next season. That is how they are supposed to grow. With watering, the plants stay alive and keep growing stringy stems.

All *Pterocactus* have tuberous roots. It is from the roots that the new growth emerges each season. I know nothing about the size of the roots in habitat, but some years ago I saw, under a bench in one of my hot houses, *Pterocactus tuberosus* was growing. I wanted that plant in a pot and not under a bench. We have sandy soil, and so I dug it out by hand. That plant had roots some 22 cm long and a cluster 15 cm in diameter. It must have been growing there for quite a while. It must have started from a stem that fell there. I never grew *Pterocactus* in that hothouse, so I am not sure how it got there.

One *Pterocactus* that does not lose its stems at the end of each growing season is *P. fischeri*. The description calls for a plant 10 cm tall and 1.5 cm in diameter. In the NCL, the description for the stems is <10-15 x 1-1.5 cm. What that is saying to me is that the plant stems are under 10 cm tall unless they grow in very poor light and they grow elongated. I do not know what plant they are measuring to have stems that grow only to 1.5 cm in diameter. To have stems only to 1 to 1.5 cm in diameter they must be measuring stems grown in very poor light. Plants grown in poor light will not have good spine growth. My plants, that I have had for years, are 12 cm tall, and if you cut off all the spines, would be about 1.5 to 2 cm in diameter. As the spines are part of the plant, I always measure the plant with the spines counted. I have gone out and measured the diameter of stems of my plants, and they are 7 cm in diameter spines and all!



Left, photo 3, and right, photo 4.

Photo 1 is of a healthy plant of *Pterocactus fischeri* with about half a dozen stems. Note that the short stem about center front has long twisted and flowing spines. Photo 2 is of another plant I bought from a speaker at a program some thirty years ago. Photo 3 is also of a plant of *P. fischeri*, but it is a smaller plant. Note that all of the plants have the long kind of twisting, flying around anywhere spines.

I got several cuttings of the plant shown in photo 4 identified as *P. fischeri*. It came from a grower in southern California. I say that because the grower's tags were still on the plant or plant cuttings. From the same grower came plants of *Pterocactus reticulatus* with a yellow flower. There is no such plant in habitat, but from that grower there is. I believe it was a cross of *P. reticulatus* and *P. megliolii*. In photo 4, I have to wonder what plant *P. fischeri* is crossed with. With the pattern that is on the stems, I think it would be with *P. tuberosus*. It is a wild looking plant, but still a fun one to have. It is not a *Pterocactus fischeri*, but it is a cross from that grower.

Photo 5 is of the red flowering *P. fischeri*. I decided I wanted to photograph the flower when it was open. So I went out and set up the camera, went to get the plant and the flower was not there. Then I saw it laying behind another plant. The weight of the flower broke off the stem. I stuck the stem end in a hole in a clay pot and photographed the flower. Then I took the photos of the flowers on the plant *P. fischeri* in photos 6 and 7. I say beautiful!

Then for the fun of it, I compared the flowers with the flowers from the same plant when it flowered last year shown in photo 8. What a difference! Yes, it is the same plant one year earlier. The thing I am wondering about is does the hybrid plant put out flowers leaning toward one side and then toward the other side the next flowering? I would not guess the flowers in photos 6 and 7 are on the same plant as the flowers in photo 8.



Left above, photo 5 and right, photo 6.
Below left photo 7, right photo 8.



CACTUS AND SUCCULENT DISPLAY IDEAS By Chris Willis

I began my collection of cactus and succulents in 2005. It didn't take long to realize that I needed to get the pots off the ground and, hopefully, away from the critters that liked my plants as much as I did.



My goal was to find inexpensive, but still decorative, ways to organize, maintain and display my collection. My effort to gather plant stands began with a neighborhood garage sale. Secondhand shops in Cave Creek were a good source of inexpensive items that could serve my purpose. A wire shelving unit that was left at the curb for the weekly trash pickup was a great find. I found a very sturdy metal plant rack in a gardening supply catalog. It did not fit the inexpensive category, but it was worth the price. My terra cotta plant pedestals have been a useful addition to my display.

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- Donations Coordinator: **Chris Ginkel**
- Education Committee: **Stephanie Halcrow**
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- Facebook Swap and Shop Page: **Tom Briggs, Bj Seemuth**
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- Propagation Education Group (PEG): **Tristan Davis**
- Pumice Sales: **Rich Caravello, Bob Hopfner**
- Recognition Committee: open
- Speaker Coordinator: **Lisa Moore**
- Tech and Communications: open
- Website Administration: **Peter Bockenthien, Angela Stephens, Brian Simmons**
- YouTube Administrator: **Brian Simmons**

Direct any comments, questions, ideas to Editor Sue Hakala.

SPECIALISTS TO CONTACT WITH QUESTIONS

- **Tristan Davis** Manages the Seed Depot. Specializations include plant propagation and heading PEG (Propagation Education Group).
- **Doug Dawson** Specializations include growing from seed, flora of Namibia, lithops, other mesembs, melocactus, and miniature cacti and succulents of Arizona.
- **Tom Gatz** Specializations include adenium, agave and growing succulent trees as bonsai (bursera, portulacaria, ficus, operculicarya, pachycormus, etc.).
- **Dean Patrick** Specializations in softwood stem-cuttings, plant division and seed starting, rooting cacti, agave, and aloe.



Echinocereus x lloydii by Jeffrey Thompson.