The Case for *Pediocactus nigrispinus* as the Washington State Cactus

Ron Bockelman*
Redmond, WA

Above: Basalt cactus is easiest to spot in spring when its beautiful flowers are conspicuous.
Photo, with special thanks: Mark Turner

Early in 2022 the Cascade Cactus and Succulent Society (CCSS) launched efforts to get *Pediocactus nigrispinus* (basalt cactus) designated as the Washington State Cactus. CCSS member Jerry Vaninetti proposed the idea. He remembered how it was done for a different species in Colorado, where he lived before moving to Washington upon retirement. Ron Bockelman agreed to lead the pursuit. He has been studying basalt cactus in central Washington since 2018 as a retirement project.

Why *Pediocactus nigrispinus?* The first thing a state cactus should have is spectacular flowers, and the profuse ones of *P. nigrispinus* have brilliant pinkish-red petals surrounding a multitude of showy yellow

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Spring
1st Quarter 2023
Cactus & Succulent Society of America
To The Point

stamens (pictured above). Secondly, *P. nigrispinus* is Washington's only ball cactus, making it unique and easy to distinguish from the other two native cacti, both of which are *Opuntia* species. Historically, archaeological studies in Tekison Rockshelter found buried *P. nigrispinus* spines, suggesting it was used by Native Americans about 600 years ago. Those familiar with the acclaimed scholarly work of Lyman Benson on US cacti will find it noteworthy that the first cactus he ever collected was *P. nigrispinus* along the highway between Ellensburg and Vantage in Washington. Finally, *P. nigrispinus* is a plant species of conservation concern in Washington, so designating it as the state cactus would make people more aware of the threats that increased rangeland wildfires and climate change pose to this regionally endemic species.

PSE's Wild Horse Renewable Energy Center is surrounded by the sagebrush-shrub habitat preferred by *Pediocactus nigrispinus*. Photo: Andrea Crawford

Why call it basalt cactus? While there may not be a group of plant enthusiasts more enamored of long tongue-twisting scientific names than CSSA members, nothing beats a good common name for getting the public engaged. We decided that basalt cactus is better than hedgehog cactus or snowball cactus because those names are already widely used for many species of *Echinocereus* and *Mammillaria*, respectively. Not only is basalt cactus easy to say and write, it also is true to the reputation of *Pediocactus* for having several species each of which is restricted to a specific geological substrate. A good example is gypsum cactus for *P. sileri*. For *P. nigrispinus* the substrate is shallow rocky soils (lithosols) derived from basalt bedrock.

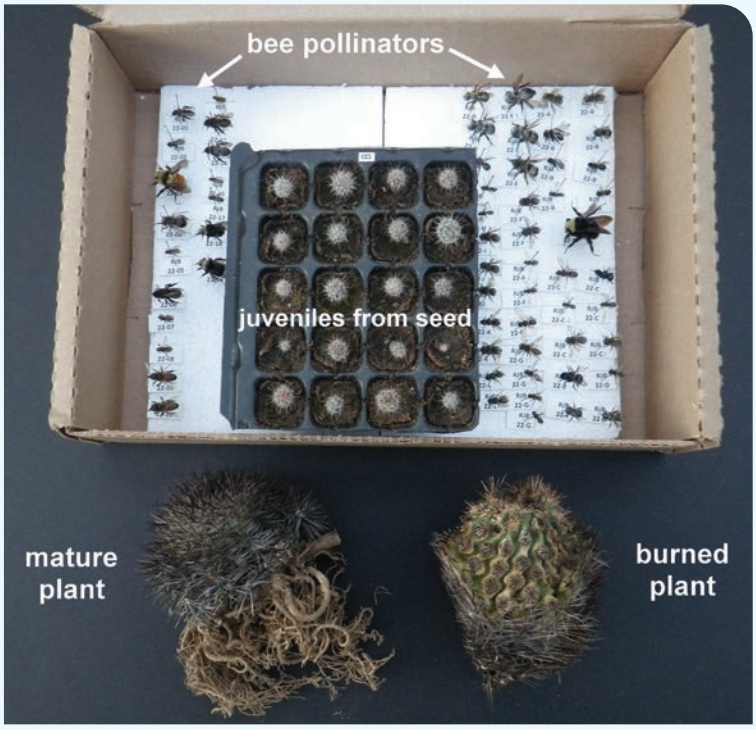
Who else is involved? We soon contacted Ron's friends at Puget Sound Energy (PSE), which owns and operates Wild Horse Wind Farm in Kittitas County, where he conducts many of his studies. Their Renewable Energy Center (aka visitor center) provides opportunities for over 10,000 visitors annually to learn about basalt cactus and see it in sagebrush-steppe habitat around the building (pictured top, right). Because PSE is a state-regulated utility, their staff also have insights into the legislative process for state designation in Washington.

What is the plan? Late last spring we decided that the best strategy was to get a school in the Ellensburg area to help promote the state cactus designation to state legislators by taking it on as a class project. Most visitors to the Wild Horse visitor center each year are primary, secondary, and college students on spring field trips. Thus PSE staff at the visitor center have contacts with many teachers. About this time Ron got super busy with cactus field studies, and most classes ended their school year. So not much happened over summer.

What school is involved? Last fall Andrea Crawford, who manages the Wild Horse visitor center, informed us that Discovery Lab in Ellensburg was interested in having their elementary school students write letters to legislators in support of the state cactus designation. Discovery Lab is a school that emphasizes project-based learning, community engagement,

and competency-based study. Their students had learned about basalt cactus during a past field trip to the wind farm.

How did the students get informed and enthused? Natalia Parker, the director of Discovery Lab, asked what the students should include in their letters, so we provided some ideas. Then in early November Ron visited the school to tell the students about some of his cactus studies. Showing them little basalt cacti grown from seed, native bee specimens collected from cactus flowers, and a mature plant whose spines were burned to short stubs by the recent Vantage Highway Fire (pictured, top left) made for an enjoyable interactive show-and-tell rather than a boring (blah-blah-blah) talk. To keep them excited about basalt cacti, Ron left a 4-inch pot of germinating seeds and seedlings for the kids to take care of.



Top: Discovery Lab students were excited to see several aspects of basalt cactus biology. Photo: Ron Bockelman

Bottom: Discovery Lab students wrote letters to state legislators. Photo: Natalia Parker

How were the state legislators approached? On November 28th Natalia talked with District #13 legislators at a Legislative Fair sponsored by the Ellensburg Chamber of Commerce. This legislative district encompasses most of the basalt cactus habitat in Washington. Although Natalia's main focus was to inform them about Discovery Lab, she also brought up the idea of making *Pediocactus nigrispinus* the state cactus and read one of the student letters. State Senator Judy Warnick asked Natalia to mail the student letters right away because she felt this was an idea which could get bi-partisan support and be acted on. A batch of eight student letters was mailed on November 30th (pictured, bottom left).

What's next? We are optimistic that a bill will be introduced in the current legislative session, which began in January. Once a bill number is assigned, the time will be right for CCSS and its members to provide letters supporting this state cactus designation. We expect similar support from the Washington Native Plant Society, which both Jerry and Ron are members of. After the bill is passed, the final step will be signing of the resultant act by the governor to officially make *Pediocactus nigrispinus* the State Cactus of Washington.

Watch for future updates on WA's *Pediocactus nigrisinus* in the *Cactus and Succulent Journal.*

Succulents with Altitude

CSSA 2023 Biennial Convention

July 12–16, 2023
Colorado Springs, CO.

CSSA Colorado Convention
Pikes Peak or Bust!

Paint your wagon and come to Colorado Springs for all of the great reasons—the renowned speakers, the camaraderie with your kindred cactus and succulent old friends and new friends,and the ambience of a 14,115' mountain nearby with the pleasant climate as a bonus.

Additionally, garden tours, habitat exploration and a train to the top of Pikes Peak await. Our first convention in four years (seems longer) is nigh and you will not want to miss this event. Be enthralled as you learn about cacti and other succulents from the four corners of the earth, from extreme hot deserts to the coldest environments where cacti grow.

Don't forget, if you are not yet a member, a $20 membership allows you to register and attend. Please use the following address http://www.cssaconvention.com to access all of the information you need and answer all of your questions.

We look forward to greeting all attendees and welcoming you to Colorado Springs.

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Convention Website: https://cssaconvention.com

Online Registration: https://cssa.myshopify.com/collections/convention-memberships

Hotel Information: https://cssaconvention.com/hotel_info.html

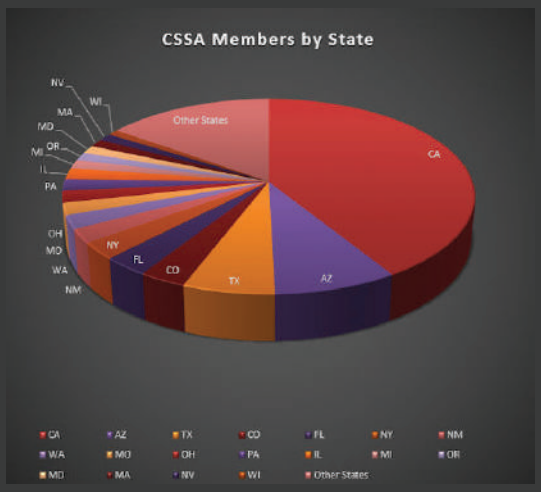
Speakers and Lectures: https://cssaconvention.com/speakers_2023.html

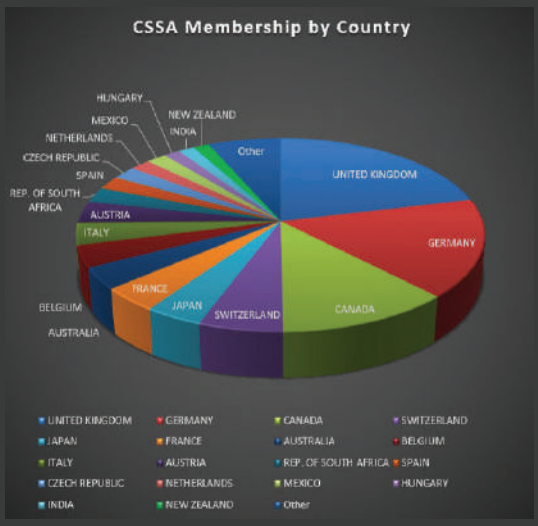
Tours and Field Trips: https://cssaconvention.com/field_trips.html

CSSA welcomes new board members, extends appreciation to those exiting

Pictured, left to right: Irwin Lightstone (VP), Ann Hopkinson, Jackson Burkholder, Art Scarpa, Peter Breslin (Managing Editor), Phuc Huynh, Dave Ferguson, Kelly Griffin, Rod Haenni, (President), Jeff Pavlat (Past President), (Back row), Nels Christianson (outgoing director), Gary Duke (outgoing director), Mike Hellmann, John Martinez, Nick Diomede (Treasurer), (Front row, left to right), Gunnar Eisel (Executive Director), M.A. Bjarkman, Roxie Esterle (Secretary), Kimberly Gomez Tong.

Not pictured: Gregg DeCherico, Brian Kemble (outgoing director), Cliff Meng (outgoing Treasurer), Laurel Woodley (advisor).





Where do CSSA members come from?

The basic demographics for CSSA have been relatively unchanged in recent years. However, the CSSA Webinars, the *To The Point* e-newsletter, and more emphasis on cold-hardy succulents have shifted the membership a bit toward the east.

Internationally, CSSA has the strongest following in The United Kingdom, Germany, and Canada.

2023 CSSA Photography Contest Announcement

So many striking images were submitted in last year's photography contest that CSSA just had to sponsor another contest. In addition to the listed prizes, the winners will have prints of their images displayed during our upcoming Convention in Colorado Springs. Enter and share the joy of your cactus and succulent images.

Who May Enter: This contest is open to all current CSSA members and all youths under the age of 16. There is no entry fee. Entry categories are based on age. Entrants who are 16 years of age or older as of the closing date of this contest must enter in the adult category. Entrants who have not reached their 16th birthday before the closing date of this contest will enter as youths. Youth entrants do not need to be CSSA members. CSSA Board members, contest judges, and CSSA employees are not eligible.

Theme of Contest: "Patterns and Textures in Cacti and Succulents"

Each image must feature one or more cacti or succulents. Enter up to three of your most magic images involving patterns and textures in cacti or succulents.

Prizes: The following prizes will be awarded to the winners in both the adult and youth categories.

- **First Place:** (Adult) $100.00 Gift certificate from B&H Photo – Video, publication of the image in *To The Point*, and an 8 x 10 inch (approximate) print of the image. (Youth) $100.00 Gift certificate from a CSSA selected vendor, publication of the image in *To the Point,* and an 8 x 10 inch (approximate) print of the image
- **Second Place:** $25.00 credit toward purchase at the CSSA Seed Depot, Publication of the image in *To The Point*, and an 8 x 10 inch (approximate) print of the image.
- **Third Place:** Publication of the image in *To The Point*, and an 8 x 10 inch (approximate) print of the image.
- **Honorable Mention:** Publication of the image in *To The Point*.

Contest Period: The contest will begin on March 20, 2023, and end at midnight, May 1, 2023 PM PDT. Photographs submitted after the expiration of the contest period will not be accepted.

How to Enter: Click here for photo submissions and complete contest rules

Not a CSSA member? CSSA Supporting membership is only $20 per year and includes all CSSA benefits except the quarterly *CSSA Journal*. CSSA Full membership is $50 per year and includes the quarterly *CSSA Journal.*

CSSA Membership Benefits:

- Receive the prestigious Cactus and Succulent Society Journal, published four times annually.
- Receive *To The Point*, our CSSA e-newsletter, published four times annually, featuring news, views and growing tips from around the world.
- Participate in CSSA's bi-monthly Webinar Series featuring C&S experts from around the world.
- Access and purchase rare C&S seeds at our CSSA Seed Depot.
- Participate in CSSA's members-only field trips to native habitats of cacti and other succulents.
- Participate in the CSSA convention. The next convention will be in Colorado Springs in 2023. Stay tuned!
- Support CSSA's mission of conservation, research, outreach, and educational projects.

A few winners from the 2022 CSSA Photo Contest.

Gethyllis namaquensis, Richtersveld, South Africa (top)
First Place - Rob Skillin

Echeveria 'Etna' (center)
First Place/Youth - Annika Chan's (15 yrs. old)

Gymnocalycium borthii subsp. *nogolense* with bud and spines (bottom)
Second Place - Dr. Detlev Metzing

Dave Malkoff (left) sees first hand the effects of climate change with researcher Peter Breslin (right).

What's killing this cactus?

www.youtube.com/watch?v=Ta8a3GPFJ3k&authuser=2

After thousands of years, the Saguaro cactus might have met its match: climate change.

Dave Malkoff, of The Weather Channel, investigates in Saguaro National Park in Arizona. Featured is Peter Breslin, Managing Editor for the CSSA. He is currently doing saguaro research for his postdoc at the University of Arizona's Desert Lab on Tumamoc Hill.

Thanks to The Weather Channel for this segment filmed in December 2022. W/ @TheWeatherChannel@uarizona

On the CSSA Website

...NEW CSSA Membership Levels
https://cssa.myshopify.com/collections/join-cssa

...Register for Upcoming Webinars
https://cactusandsucculentsociety.org/

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https://cactusandsucculentsociety.org/Affiliates/affiliates.html

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*Convention attendance and Seed Depot are available only to paid members.

...Stay up-to-date!

2023 CSSA Convention*

in Colorado Springs

https://cssaconvention.com/cssa2023/index.html

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“It melts in your mouth, not in your hands.”

Sue Haffner, Fresno, CA

Reprinted from Cactus Corner News January 2023, Fresno Cactus & Succulent Society

Euphorbia antisyphilitica was named for its use by cowboys and early settlers in the Chihuahuan Desert and adjacent regions as a supposed preventative of syphilitic infection. In an unusual twist of history, it later became used by millions of people in the United States, Mexico and elsewhere around the world for quite a different reason. Perhaps most readers of this paragraph have consumed a substance from this desert plant. Where the plant is native in Mexico, harvesters make treks out to the hills where it grows and rip it up, roots and all, from the desert. The plants are bundled and lashed high on the backs and sides of burros to be transported to a camp in the desert where they are boiled in water to which sulfuric acid has been added.

A wax from the plant forms a scum on the surface. This is raked off, thrown into buckets and taken to Candelilla wax collection centers to be purified. This edible wax remains hard under conditions of high heat and humidity, as opposed to chocolate and other covers of candies and confections which stick to wrappers and hands. Because the wax is water soluble it has been widely used as a covering for pellet-sized gums and candies which “melt in your mouth, not in your hand,” Although chocolate bars are popular in cold regions or in winter, the Candelilla wax covered items have proven more marketable in hot desert regions or in summer.

(From: “Living with Desert Plants”
Boyce Thompson Southwest Arboretum)

Euphorbia antisyphilitica: One of the Wild Dozen

"A collaborative report by the Food and Agriculture Organization, TRAFFIC, and the IUCN Species Survival Commission Medicinal Plant Specialist Group (MPSG) evaluates twelve flagship wild-harvested ingredients, assigning them social and biological risk ratings to highlight where improvements can be made.

This April 2022 Wild Check report outlines the opportunities for sustainable trade of wild plant ingredients amid a surge in global demand".

-From the IUCN website

Find the full report here:

chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.fao.org/3/cb9267en/cb9267en.pdf

Euphorbia antisyphilitica, cultivated, Desert Botanical Garden, Phoenix, Arizona
Photo: https://upload.wikimedia.org/wikipedia/commons/0/01/Euphorbia-antisyphilitica-20080330.JPG

Euphorbia antisyphilitica at the Springs Preserve garden, Las Vegas, Nevada.
Photo: Stan Sheb,
https://commons.wikimedia.org/wiki/File:Euphorbia_antisyphilitica_1.jpg

A closer look at

Pelecyphora aselliformis

Echo Pang, Houston, TX
Reprinted from Kaktos Komments Jan/Feb 2023,
newsletter of the Houston C&SS

Origin and Habitat: *Pelecyphora aselliformis* is a cactus originating in San Luis Potosí, Mexico. The name comes from Greek *"pelekus", which means* hatchet. *"Phoros" means* bearing, referring to the shape of the cactus tubercles. The species name "*aselliformis*" describes the morphology of the cactus spines that look like *Oniscus asellus*, or woodlouse.

The habitat of *P. aselliformis* is near the city of San Luis Potosí, located in central Mexico at over 1800 meters in altitude. The climate is arid subtropical, mitigated by altitude, with a very mild and dry winter from mid-November to early March and a warm summer with some rain from June to mid-October. The temperature typically varies from 41°F to 83°F and is rarely below 33°F or above 90°F. Being a very small and low growing cactus, *P. aselliformis* grows in grit under the shade of bushes so it gets protection from midday sun.

There is a rainless period of the year that lasts for 5 months (from November to April). Summer to early autumn has the most precipitation and rainfall from July to September. The most rainfall is in July (3.7 inches in an average year). Winter to late spring marks the dry season. The least precipitation and rainfall are both recorded in December (with an average rainfall of 0.2 inches).

Description: *P. aselliformis* is a small cactus with a spherical to cylindrical stem. A flowering size plant is only 5-10 cm tall, 2-5 cm in diam-

Name: *Pelecyphora aselliformis*
Synonyms: *Ariocarpus aselliformis; Mammillaria pectinifera*
Common names: Woodlouse cactus, Peyotillo, Hatchet cactus
Family: Cactaceae
Genus: *Pelecyphora*

Pelecyphora aselliformis taken at Chihuahuan Desert Research Institute
Photo: Irwin Lightstone

Oniscus asellus, or woodlouse
Photo: Andrawaag - Own work, CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=76645671

Seedlings at the base of an old plant in the growing pot:

https://www.cactus-art.biz/schede/PELECYPHORA/Pelecyphora_aselliformis/Pelecyphora_aselliformis/Pelecyphora_aselliformis.htm

eter. A young plant is pencil-like, tall and thin. It can look quite different than an older plant when it starts to become more spherical and forms a cluster. Its grayish-green color tubercles are flattened underneath the oval shape areoles (elongated and very close together). The spines resemble the most characteristic feature of this species - pectinated and look just like a woodlouse on top of each areole!

Floral buds usually form on the apex of the cactus in early spring, after the cactus has a rest during the dry winter. Flower season is from spring to mid-autumn. Flowers only open on sunny days. Each flower is 2-3 cm in diameter: pink to violet in color with lighter outside petals with orange anthers and white stigmas.

Note: This species is congeneric to *Pelecyphora strobiliformis*, with almost identical floral, fruit, and seed morphology, as well as the internal structures. *P. strobiliformis* and *P. aselliformis* are the only two species comprise the genus of *Pelecyphora**.

Pelecyphora aselliformis is known to contain a trace amount of Mescalline, a psychoactive substance in the same way as *Lophophora williamsii*. That gives them the nickname "*Peyotillo*". The wild population of both species of *Pelecyphora* are classified as "being of Least Concern on the IUCN Red List." (The International Union for Conservation of Nature (IUCN) Red List of Threatened Species, also known as the IUCN Red List or Red Data Book, founded in 1964, is the world's most comprehensive inventory of the global conservation status of biological species.)

Cultivation and Propagation: *P. aselliformis* is a very slow growing species. It has a tuberous root system that requires excellent drainage from its soil. Grow it in direct morning sun or afternoon sun with mid-day shade for a compact spinal growth. Waterings should be sufficient in summer but restricted in winter, when nighttime temperatures remain below 10°C (50°F). In spring and fall, it needs very little watering in Houston. You can give this plant a light monthly watering to prevent shedding of the lower tubercles if your pot is small and the potting medium dries out too fast. Although it is hardy to -4°C for a short period, growing this cactus in a greenhouse or indoors during winter in Houston is the best. Good ventilation is crucial for the overall health of this cactus.

*Managing editor's note: these were the only two species in the genus *Pelecyphora* until a 2022 research study moved the former genus *Escobaria* into an expanded circumscription of *Pelecyphora*. cf. https://pubmed.ncbi.nlm.nih.gov/35106054/

Pelecyphora aselliformis

Photo: Michael Wolf, CC BY-SA 3.0 <https://creativecommons.org/licenses/by-sa/3.0>, via Wikimedia Commons https://upload.wikimedia.org/wikipedia/commons/7/7e/Pelecyphora_asseliformis_20070526.jpg

P. aselliformis in habitat

Photo: Steve Plath

It can be reproduced both by seeds and cuttings. Plants in cultivation today are often grafted because they are slow to grow on their own roots. Grafting pups from older specimens is a much easier way of propagation than sowing.

The rarity in cultivation, its characteristic tubercles and showy flowers plus the challenge of growing from seed successfully make the woodlouse cactus highly valuable and desirable by cactus collectors.

References

https://www.iucnredlist.org/species/152618/121601538

https://www.cactus-art.biz/schede/PELECYPHORA/Pelecyphora_aselliformis/Pelecyphora_aselliformis/Pelecyphora_aselliformis.htm

https://weatherspark.com/y/5131/Average-Weather-in-San-Luis-Potos%C3%AD-Mexico-Year-Round

https://www.climatestotravel.com/climate/mexico/san-luis-potos%C3%AD

IT'S OK TO KILL PLANTS

By Kenton Seth, Paintbrush Gardens, LLC
www.paintbrushgardens.com
Reprinted from *The Central Spine* October 2022,
Newsletter of the Central Arizona C&SS

The best growers of cacti and succulents have killed the most numbers of plants. So if you want to be an amazingly successful plant grower, get to work killing some. In the grand scheme of things, there is no other way to know the absolute limits of what a plant can handle until you've crossed that line and find yourself with a deflated spiny balloon instead of a plant in your flowerpot.

Why Do Plants Die? Know that momma nature kills most of her plants before they reach maturity. "Survival of the fittest" means "death to everyone else." Plants less suited to their natural setting get killed off, and those more suited live on. To keep that balance, generally, in nature the majority are killed. The blooming beautiful plants we see hiking are the minority which have survived up to that point. The factors which can kill a plant are many: water, temperature, soil, light, air movement, attackers from bacteria to deer, and others.

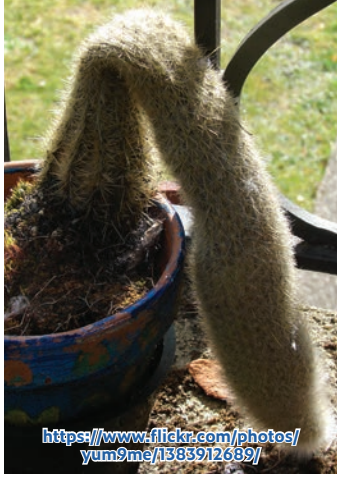
Think of it this way; a plant has a certain amount of stress it can handle and be just fine. On the invisible gauge of plant health, between that thin green wedge of "thriving!" and that red zone labeled "death!", there is a very wide wedge of "stressed but fine." Plants in nature spend most of their time here. Among the different stresses a plant can have, it's often not one but a combination which can stress a plant. Sometimes it is just one stress, like death by salt poisoning because the dog peed on it. Sometimes it's a combination death. The plant was weakened, say by drought stress, or for too long when it suddenly received no light. Then two things killed the plant.

> Steve Plath, grower extraordinaire says: "Remember you are growing roots not plants."

Knowledge from friends or a good book can provide the specific ways that plants "communicate" exactly which stress is nagging them to death. A little bit of learning empowers a grower of plants at home to a fast-track of improvement. Perhaps one of the most common stresses among cacti is etiolation. This is a fancy word for the plant stretching for light because there is not enough. This is what turns formerly cute little balls of cacti into awkward footballs and Hershey's Kiss-shaped things.

As the home caregivers, we are the architects of the plant's environment. If they die, we have the choice to see it two ways: 1. We don't understand the plant's needs and didn't give it those. 2. That plant was not suited to how we tend to provide for our plants, which is more common among expert or long-time growers of plants. We knew the plant's needs but did not provide them. Maybe you left that tropical cactus outside in October when the first frost happened, or maybe you went on holiday and forgot to tell your plant babysitter not to water that plant.

One trick to growing new plants, and especially cacti, is to understand where they come from. They evolved and are equipped for that place. We can fool them into being happy in our homes. For instance, lithops from South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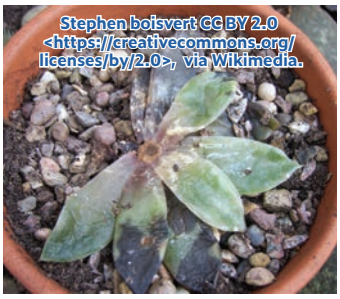
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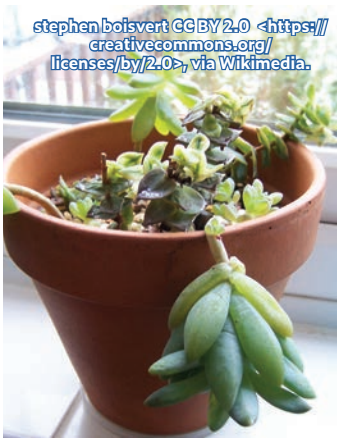
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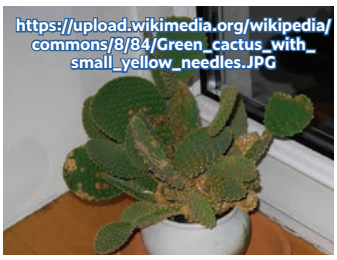

https://upload.wikimedia.org/wikipedia/commons/8/84/Green_cactus_with_small_yellow_needles.JPG

Africa like to be cool, extremely sunny and lightly watered in winter, but almost no water in summer. That's what it's like in their corner of South Africa. Watering lithops in summer tends to lead to death. They essentially drown while asleep.

Autopsy for Education Look at those dead plants and see what they can say from the grave. This is where "reading" your plant's stresses gets extreme. A rotten base, turning brown, or smelly? Plant fell over? Or, lots of yellowing lower leaves of succulents? Probably overwatering. A white change of color? This is where using the mega-library of expertise from members of cacti clubs, in person or online, is an unmatchable resource for help.

What Do You Do With What You Learn? Dead plants may tell you what was missing or excessive, so now you have choices of action.

Change Your Habits Getting into a habit of watering your potted cactus outdoors every Sunday or watering your in-ground cactus garden once a month might be the breakthrough to sudden success with your plants.

Change The Place Maybe that cactus is stretching in the north window. Time to move it to the south window. Maybe the cactus is getting a little too wet when you water everything else, so you can change the potting mix to drain better with more lava-rock or perlite. Perhaps it's time to...

Give Up This is legitimate. Sometimes no matter how hard you try, your lifestyle or home is not good for that plant, or the hassle to get it done is not worth the return.

Lithops, African violets and ferns are not meant for me, for instance, because of poor winter light, traveling in summer and being gone for more than three days, respectively. So I've quit the suffering and quit trying plants which barely survive (which often means barely die) in my care. I'm not giving up summer vacations for ferns, as much as they call me like dancing sirens. In fact, travel led me to embrace cacti. Along these same lines, I've finally given up on growing most plants that are adapted to acid soils, the wet Himalayas and the cool-loving coastal succulents. I'm not sad about it. I've embraced South American cacti and agaves because of their ease and the amazing variety they provide.

Concluding the Death Talk It is for their known ease of care that cacti and succulents become a hobby for many folks, especially those who hate fickle, picky, prissy plants that want constant coddling. Cacti and succulents might need less, but they still need. Their needs are different. Any plant is easy in the right place, and any place is easy to grow a plant in if the right one is picked. So go out today, buy a plant and be okay with killing it. Then enjoy it when it surprises you and lives.

Lithops fulviceps 'Aurea' cultivar with greenish leaves and white flowers, a plant in the family Aizoaceae. Endemic to Namibia, its natural habitats are rocky areas and cold deserts that are being threatened by habitat loss.

Photo: Ivan I. Boldyrev - private collection of Ivan I. Boldyrev, CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=250033

Huernia zebrina **grown by Dennis Wheeler, Arroyo Grande, CA**
Photo: Gary Hunt, https://birdcamoncheltenham.blogspot.com/search/label/Cactus

Sex and the Succulent

Tim Malinich
North Ridgeville, OH

Reprinted from
The Spine,
A Quarterly Newsletter of
The Midwest Cactus and
Succulent Society
Summer 2022

Our regular Affiliate meetings have hosted presentations on grafting, vegetative propagation and seed starting but we have not covered sexual propagation. Unlike vegetative propagation, sexual propagation involves the exchange of genetic material which is an advantage for populations that constantly need to adapt to change. That small variation in genes is why your kids don't look exactly like you, why you don't look exactly like your siblings. Genetically, there is an extraordinarily tiny difference between any two of us—we are more the same than we are different. Our plants are similar, those tiny dif-

The *Cleistocactus brookeae* (shown above) blooms throughout the year and produces copious amounts of deep maroon pollen, but refuses to set seed when self-pollinated. Wanted: *Cleistocactus brookeae* pollen from an unrelated plant.

Sometimes you get a little (in this case it is very little) help from friends. Flowers on *Rebutia neocumingii* subs. *lanata* (syn. *Wiengartia lanata*).

My no-cost pollination tool: dried *Cleistocactus* flowers, trimmed to the base only, then glued to a bamboo coffee stir.

ferences help succulent populations adapt to drought, flooding, heat, pests and disease.

There are entire books dedicated to the ways that plants procreate—the botany of flowers, attracting pollinators, etc.—but we'll jump straight to pollinating our collections. There is a bit of botany you should be familiar with before proceeding. The male parts are the anthers, which shed pollen for transfer to the female portion of a flower. The female organ is the pistil (made up of three parts: stigma, style and ovary).

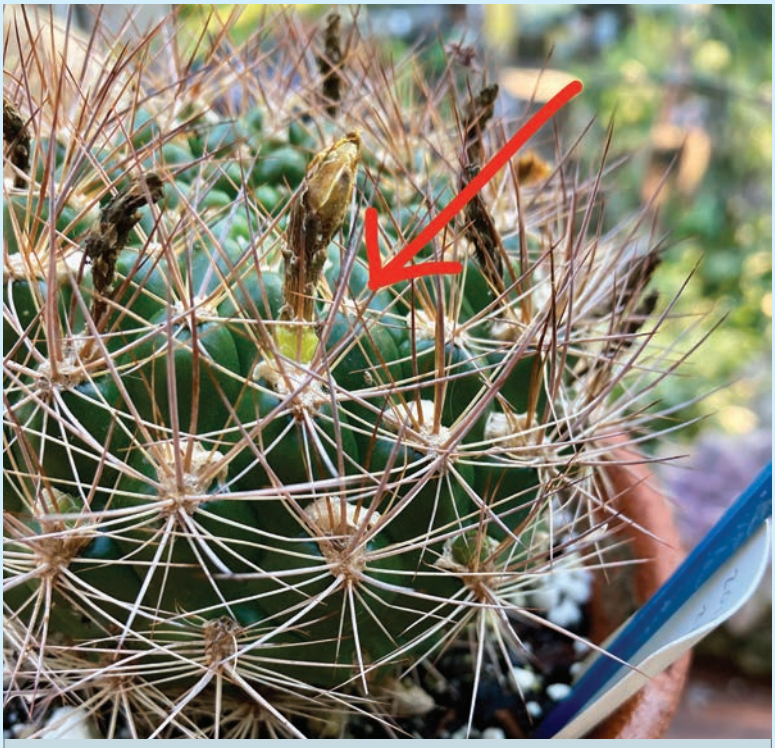
One of the first things to consider is how to transfer the pollen from one flower to another. Some plants take care of this all by themselves. Beans, peas and tomatoes are a good example of plants that will take care of their own pollination needs. The flowers are built in such a way that pollen will automatically fall onto the stigma, bypassing the need for a pollinator and keeping the genetics reasonably pure—this is the reason beans, peas and tomatoes are the easier vegetables for seed-saving.

You can often see loads of pollen shed inside the open blossoms in many cacti. Wind, insects, mammals and gravity can move that pollen to the surface of the stigma for pollination. Left to their own accord, several of my *Mammillaria, Pelargonium, Stapelia* and *Ceropegia* will flower and fruit every year. But, if you have a desire to assure pollination, or to try your hand at some hybridizing you will have to help nature along.

My trusty hand-pollinating tool used to be a small paint brush (hair bristles, not nylon). I could brush the pollen from the inside of one flower, then dust the surface of the stigma with pollen. Since all the pollen and all of the stigmas on a particular plant may not be receptive at the same time, I typically just work on all the flowers, moving from one flower to the next around the plants then back again. This gives me a good mix of pollen on the brush which will persist from one day's pollination to the next. Because the pollen on the brush remains viable, I have one brush for each species or cultivar so I don't unintentionally cross pollinate plants.

You don't actually need paint brushes to pro-

One pollination tool per species is the rule. Store it in the pot for safe keeping and immediate use.



Pollination is followed by fertilization then fruit set. The small yellow fruit below the retained flower will dry, split open and release the seeds.

vide pollination services. You can buy very expensive "pollination brushes" online but most growers I know have found more down-to-Earth methods. Any item that will carry pollen and not damage the stigma will work. Some people will actually use dead bees glued to a stick, pushing them into one flower and moving to the next. I had read one publication where a cat's whisker (without the cat attached) was used to reach inside deep tubular flowers. I have even gone so far as to pick up a male *Euphorbia obesa* and hold it upside down over the blooming female plant to rub their 'naughty-bits' together.

My most recent pollination tool has been the dried base of an old *Cleistocactus* flower glued to coffee stir stick. The dry fuzzy flower base holds lots of pollen, the bamboo stir sticks are free ("Pardon me, can I have ten stir stick to go with my coffee?") and they last the whole season. You can dip the pollination tool in alcohol to kill any remaining pollen if you need to move it to another species but since these pollinating sticks are free, just make one for each species.

When you begin to pollinating your own plants you will also notice that you just don't get fruit for every plant. Plants are very particular about their sex partners and they won't accept just any pollen. The pollen and stigmatic surface are chemically 'coded' to only allow the right type of pollen to grow. The style in some plants will actually kill the growing pollen tube of an unacceptable mate.

These picky plants are not self-fertile and need to be cross pollinated by another plant of the same species. Flowers from the same plant will not work—these plants want to make sure they are exchanging genes with another plant, thereby insuring genetic diversity. For example, I have a *Cleistocactus brookeae* that flowers all season long but refuses to produce fruit. Even if I had a flowering cutting from this plant it would still be genetically identical to the original and would not accept the pollen. I need another *C. brookeae* from a different source (such as a seedling) for successful pollination.

Give your plants great care this season. Get them in bloom then try your hand at pollination. There is so much more to pollination and hybridization- and the process of fertilization is fascinating. But for now, consider taking on a different aspect of succulent care by producing your own seed and maybe even a few hybrids.

There are many opportunities to try your hand at pollination and seed production. This is what was available to work with in late May.


IN DEFENSE OF PLANTS BLOG PODCAST

An Intriguing Relationship Between Ants and Cacti

April 9, 2019

The extrafloral nectaries of *Pachycereus gatesii* appear as tiny red bumps just below the areole.

It's hard to think of a group of plants that are better defended than cacti. Frequently and often elaborately adorned with vicious spines, these succulents make any animal think twice about trying to take a bite. And yet, for some cacti, spines don't seem to cut it. A surprising amount of species appear to have taken their

Matt Candeias, PhD.
Ecologist, Author, Podcaster

https://www.indefenseofplants.com/blog/2019/4/3/an-intruiguing-relationship-between-ants-and-cacti

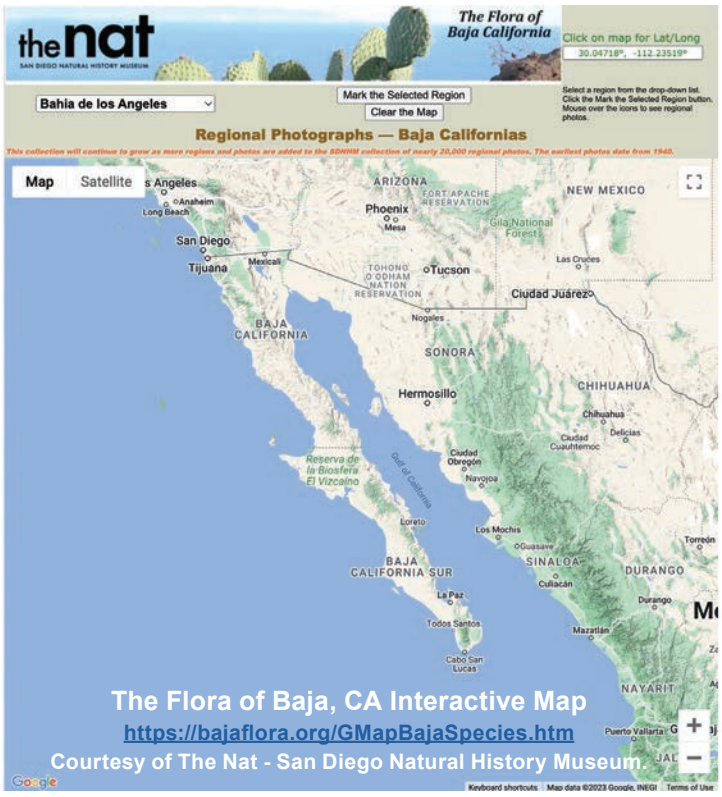
How and why do cacti secrete nectar from non-floral organs? As with many other plants, employing this strategy using extra floral nectaries looks to be a cooperative effort with ants to enhance both parties' survival. But does it always work out?

Beautiful photos illustrate this blog post from *In Defense of Plants*.

Chollas & Biodiversity Revisited

https://www.indefenseofplants.com/podcast/2023/3/5/ep-411-chollas-amp-biodiversity-revisited?rq=-Jon%20Rebman

On a recent *In Defense of Plants* podcast, Host Matt Candeias welcomed Jon Rebman, Ph.D., Curator of Botany, San Diego Natural History Museum, for a deep dive into plants of the Baja Peninsula. Titled, Chollas & Biodiversity Revisited (Ep. 411), Dr Rebman's research reveals some compelling facts about the array of endemic species he studies there.



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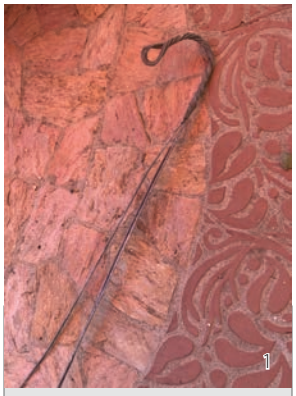
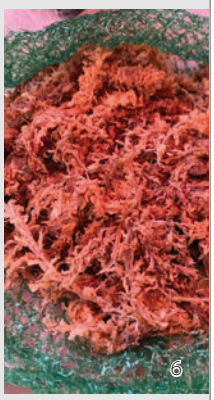


An inexpensive* way to build a moss-covered pot for finicky epiphytic cacti.

Linda Sinkovic, Santa Cruz, CA

Reprinted from *Epi NewsAugust 2022,* San Diego Epiphyllum Society, Inc.



1. 3-wire hanger
2. Line, pencil, netting
3. Hydroton
4. 4" pot, drilled and sealed
5. Net bag
6. Moistened moss placed in net bag

Most epiphytic cacti are happy to grow in a pot with fast draining substrate. However, there are some epiphytic cacti which are extremely fussy about where they grow, for example *Rhipsalidopsis rosea* and *Schlumbergera lutea*. To grow these plants, moss covered pots can be useful.

Look online and there are some really nice moss covered pots for sale. There are sites with explanations of how you can "grow your own" moss covered pots – that is, put moss into a blender with buttermilk and the resulting mixture will then grow moss on the outside of the pot. Either of these options would be a reasonable choice.

But you know what? I don't want to wait for moss to grow. I also prefer to figure out how to make something rather than buying it already made. For those reasons, I decided to make my own moss covered pots. I'll be honest, they are rather ugly. But they do the job and the plants seem to be happy growing on them.

So here is my way of making ugly, yet functional, moss covered pots with fairly easy to find items. This procedure takes a minimum of two days.

What you will need for each pot:

- 3 or 4 wire plant hanger (Fig 1)
- Tube of silicone caulk (not pictured)
- Fishing line – I use 20 lb – and some tool for cutting (Fig 2)
- Hydroponic clay pebbles or hydroton (Fig 3)
- 4 inch / 0.5 liter clay pot (hole in the bottom is OK) (Fig 4)
- Plastic netting from a bag of avocados or something similar, labels cut off (Fig 5)
- Sphagnum moss. Most likely it will be dried so you will need to rehydrate it. (Fig 6)
- An empty Gatorade bottle, label removed, washed and dried (not pictured)

You will also need:

- A pair of gloves
- Safety glasses
- A power drill with a drill bit for use with ceramic

Procedure Notes:

- This is a messy process – do it outside or someplace that's easy to clean up.
- Use safety glasses when drilling the pot.
- Use gloves when working with the sphagnum moss.
- If you use a four wire hanger, replace all occurrences of "three" with "four".

Day one

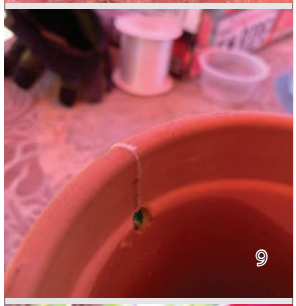
Drill three holes in the rim of the clay pot.

Remove all dust from the inside of pot, either by washing or blowing air.

Use silicone caulking to fill up the hole in the bottom of the pot. Let it harden overnight.

You are done with this for the day. Go relax.

*Though labor intensive!



7. Set pot on moss and net
8. Start of attachment
9. Fishing line knotted through hole
10. Start sewing up
11. Sewed up pot

Day two

1. Put some dried moss into a dishpan or plastic tub. Put enough water in to rehydrate it. Set aside.
2. Grab the plastic netting. Using the fishing line, sew the bottom (and sides if necessary) together to make a bag. Use plenty of knots to secure the fishing line. Set aside.
3. Place the netting "bag" on the work surface with the open part facing up. Cut a piece of fishing line about 3 or 4 times the diameter of the pot. Tie it onto the netting bag, somewhere on the open (top) edge. (Fig 7)
4. (Don't forget to put on the gloves.) Grab a big handful of rehydrated moss, squeeze out some water so it's not sopping wet, and place in the center of the netting bag.
5. Put the pot on top of the moss. (Fig 7) Grab the other end of the attached fishing line (from step 2) and thread it through the hole in the pot rim. Tie a knot or two to secure it. (Fig 8)
6. Now, using the fishing line, start sewing through the open edge of the netting bag and pulling it tight to bring the moss close to the pot (Fig 9). You will need to keep some tension on the line. You will probably need to stuff more moss into the netting bag along the sides of the pot to fill in thin spots. (Fig 10)
7. Continue around the pot, sewing and pulling together the open edges and stuffing in extra moss where needed until you get to the next hole.
8. Thread the fishing line through the hole in pot. Pull to make the line tight, using the hole as an anchor. Tie a knot or two to secure it.
9. Continue steps 7 and 8 until you get back to where you started, at the first hole.
10. Thread the fishing line through the (first) hole and knot securely. You can cut off any excess fishing line now, or you might want to leave it for use in attaching plant labels – you can use regular plastic plant tags with a hole punched through them and the extra fishing line threaded through the hole in the tag. (Fig 11)
11. Thread the three wire hanger into the holes. Secure the hanger on the pot by (carefully) bending the ends; it's easy to break the pot, so be careful. (Fig 12)
12. Your pot is now ready to plant (Fig 13). Poke any plants through the netting until they are in contact with the moss (Fig 14). You are using the netting to help hold the plants in until they grow roots. If you need to cut the netting to make a larger hole for the plant, you can use fishing line to sew it back up.
13. When plants are attached, put about a handful or two of clay pebbles into the inside of the pot (Fig 15). This will keep the bottle from sitting on the bottom of the pot.
14. Fill up the empty gatorade bottle with water, invert it while placing it into the pot (as if you were putting a bottle into an office-type water cooler) (Fig 16).

Congratulations, you are finished! You can hang the pot now. When you need to add more water, take out the bottle, fill it back up, and put it back into the pot. Note there will be a certain amount of dripping and water splashing from the pot when you water, so make sure there's something on the floor to catch the drips.

Acknowledgements:
Thanks to Rudi Dorsch, both for suggesting a similar setup as a way to grow *Rhipsalidopsis rosea*, and for suggestions on writing this article.

Much of my inspiration came from an article by Doctor Ralf Bauer, "Eine neue erfolgversprechende Kulturmethode für *Hatiora rosea* (Lagerheim) Barthlott", *EPIG Journal* 58 (2007):17-22

12. Tag attached
13. All sewn up
14. Planted
15. Hydroton in pot
16. It's done!

Moss-covered pots Update

Linda Sinkovic,
Santa Cruz, CA


1


2


3

Honesty compels me to tell you the *Schlumbergera lutea* ssp *lutea*, pictured above (Fig 1) and referenced in my previous article (pages 17–18), became very unhappy with hot temperatures last summer and fell apart. It was about 3 years old when I took this photo. Currently, segments of it are slowly regrowing (Fig 2). *Schlumbergera lutea* ssp *bradei* (Fig 3) also struggled and is now trying to bounce back.

My plants in moss-covered pots live outside in a shade house covered with shade cloth and sheets of greenhouse plastic. There are plants hanging above the moss-covered pots to give them more shade. This also keeps the humidity up which is important for these *Schlumbergera* here in central California.


4

Two photos of the same *Rhipsalidopsis rosea* plant; one of just the plant (Fig 4), and one a little farther out (Fig 5) showing what I mean about them growing 'in more shade'. The shelf they are hanging from is against the east wall of my house, about 12 to 15 inches away from the house wall. As I mentioned before, they are in a covered shade structure, and it's usually about 5˚ F warmer in there than outside under the clear sky.


5

The plants are outside all year long, except for when we get hit with temps warmer than 85˚F. When that happens, I move all the *Schlumbergera* and *Rhipsalidopsis* species into the guest bath. As for winter, it doesn't get that cold here and so the plants are in the shade house. I read in a British C&S publication that *S. lutea* is good down to 25˚F.

The pots are filled with rainwater and are fertilized occasionally (maybe twice a year); a few drops of 10-10-10 (diluted to 5-5-5) fertilizer goes into the pot of rainwater.

So, at this point in my moss pot family in the shade house: the *S. lutea* ssp *lutea* is slowly coming back, the *S. lutea* ssp *bradei* is growing very slowly, and the *Rhipsalidopsis rosea* seems to be doing OK.

What are Pereskias?

Kenneth Bader
Reprinted from
The Cacto-Files, Feb 2023,
Newsletter of the Austin C&SS

Saguaro and prickly pears are what most people envision when they hear the word "cactus," but the most primitive members of the family look like vines, shrubs, or small trees. These plants, commonly known as "*Pereskia*," (Fig. 1) are distinguished from normal cacti by the presence of large, non-succulent leaves. Small leaves are present on newly developing *Opuntia* pads and *Cylindropuntia* joints, but they are lost as the segment matures. *Pereskia* stems are not photosynthetic; they are brown and lack stomata and become woody with age (Fig. 2).

In 2016, *Pereskia* was formally divided into three genera based on vegetative and molecular differences. *Leuenbergeria* have red, pink, or orange flowers and the stems develop wood at an early age. They are found throughout Central America and the Caribbean. The genera *Pereskia* and *Rhodocactus* only develop woody trunks at maturity. *Pereskia* is restricted to species in the Andean region with areoles that lack leaves. The flowers are white, cream, or pinkish. The areoles in *Rhodocactus* bear leaves, and can form new shoots similar to cholla. *Rhodocactus* flowers are typically pink and they are found in southern Brazil, Paraguay, and Argentina.

Fig. 1: When not in flower, the *Pereskia* in the ACSS greenhouse is easily mistaken for just another thorny tree.
Fig. 2: *Pereskia* stems are covered in areoles, but are not photosynthetic.
Fig. 3: The plant growing in the Zilker Cactus Garden dies back down to the roots after a hard freeze. The presence of leaves born from the areoles indicates that this plant is a *Rhodocactus*.

Pereskias have been introduced into warmer parts of the world for horticulture. These spiny plants make excellent hedges, which produce large scented flowers and edible fruit. New plants can be propagated using cuttings from the succulent stems. Unfortunately they have become invasive weeds in South Africa, where they are difficult to kill and can crowd out native plants. Additional common names for these plants include Rose Cactus, Lemonvine, and Barbados Gooseberry.

References

Assai, I., and Miyata, K., 2016, An Emendation of Rhodocactus, a Genus Segregated from *Pereskia* (Cactaceae), Journal of Japanese Botany, 91, p. 7–12

Pereskias (davesgarden.com/guides/pf/b/Cactaceae/Pereskia/none/cultivar/0/)

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Frailea castanea is a small cactus native to Southern Brazil and Northern Uruguay in South America. Plants in the genus *Frailea* are cleistogamous, meaning they can produce fruit and seeds without opening flowers. However, under hot, sunny conditions *Frailea castanea* will display its bright yellow flowers, which look very nice in contrast to their chocolate brown plant body color.

From Bob Stewart, Washington, DC
Reprinted from *The Eastern Spine*,
Newsletter of the National Capitol Cactus and Succulent Society

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