

Donated to the San Diego  
Cactus & Succulent Society by  
Perlso S. Lewis (Founding Member)

# Espinas y Flores

THE NEWSLETTER OF THE SAN DIEGO CACTUS & SUCCULENT SOCIETY, INC.

VOLUME XXVIII NUMBER EIGHT, SATURDAY, AUGUST 14, 1993

## *Hot Summer Sex Issue*



The Gynoecium exposed, three pelargonium pistils showing at the top the stigmas (receptive and waiting for the male pollen) on the slender stem-like styles with the ovary (the lowest part of the pistil), the enlarged portion containing ovules, which after successful fertilization will produce the progenial seeds.

Photograph 56X, entitled "Geranium Triplet" by David Scharf, "MAGNIFICATIONS - Photographs with the Scanning Electron Microscope", Schocken Books, c 1977



welcome

## MEMBERSHIP AND MEETING INFORMATION

MEMBERSHIP: LAURA DE MERRITT, 619-571-5127. DUES ARE \$10.00 FOR SINGLE MEMBERSHIP AND \$5.00 FOR EACH ADDITIONAL MEMBER OF SAME HOUSEHOLD (ONE ESPINAS y FLORES MAILED). CHECKS SHOULD BE MADE OUT TO S.D.C.& S.S. AND MAILED TO P.O. BOX 33181, HILLCREST STATION-102, SAN DIEGO, CA. 92163-3181.

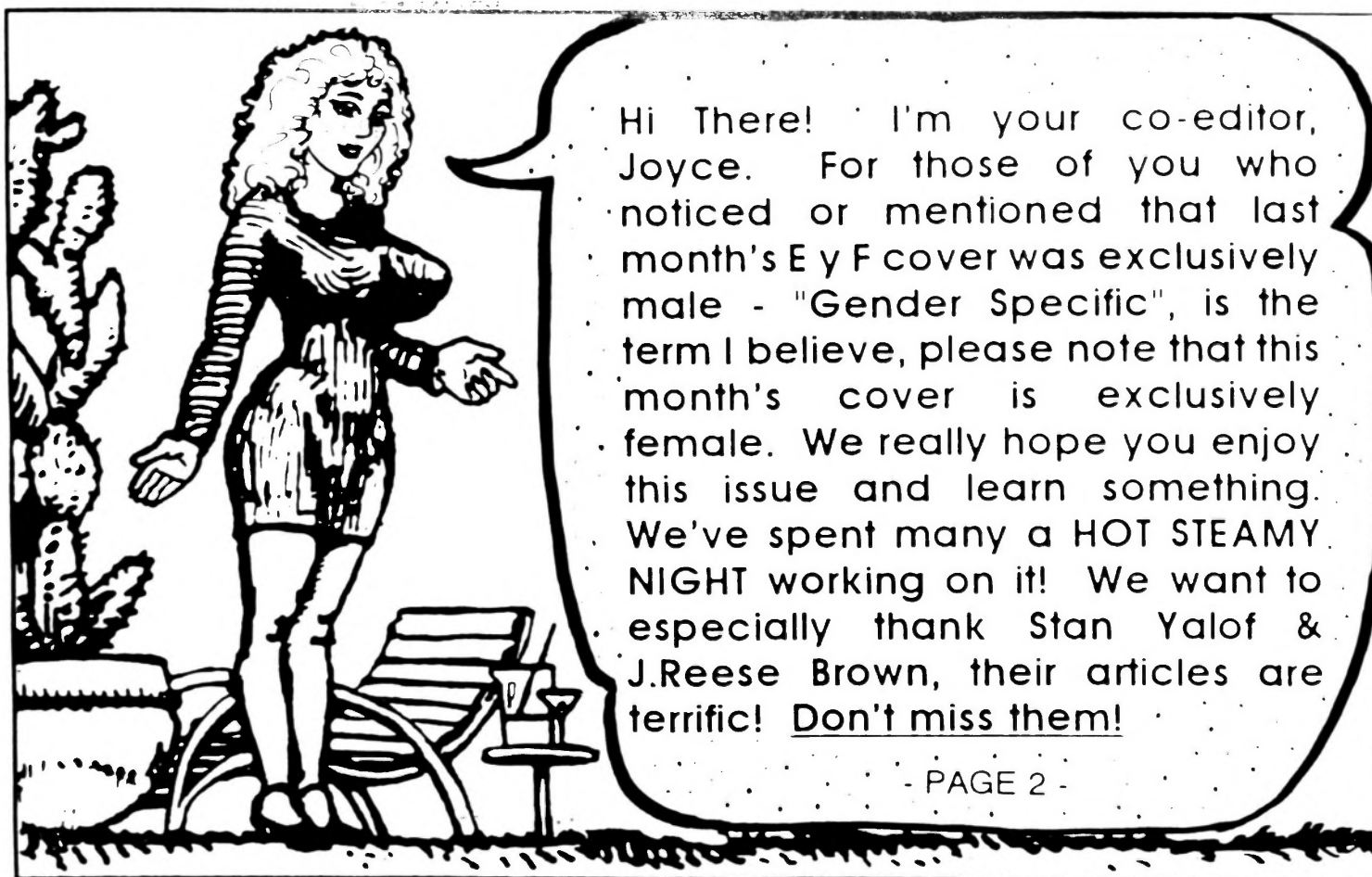
MEETING TIME: MEETINGS ARE HELD THE SECOND SATURDAY OF EACH MONTH (EXCEPT FOR JUNE & DECEMBER) AT 1:30 pm IN ROOM 101 - MAJORICA ROOM, CASA DEL PRADO, BALBOA PARK. COME EARLY FOR PLANT, CONTAINER & SUPPLY SALES AND SOCIALIZING. BOARD MEETINGS ARE HELD AT NOON PRIOR TO GENERAL MEETING.



## AUGUST PROGRAM: THE FAMILY NOLINACEAE

Jim Dice, longtime SDC&SS member, will present a slide program on the systemics, ecology, biogeography, and horticulture of the four genera of the family Nolinaceae: *Nolina* (bear grass), *Beaucarnea* (elephant foot), *Dasyliirion* (grass tree), and *Calibanus* (sacamacate), with particular emphasis on *Nolina*, his master thesis subject.

Formerly, Jim was curator of the Desert Garden at the Huntington and also a board member and conservation chairman of the CSSA. He is currently the plant ecologist and botanist for the California Department of Fish and Game for San Diego, Riverside, Orange, and Imperial Counties, and as such is on the front line in the conservation efforts for rare, threatened, and endangered plant species and their habitats. See you all at the meeting and bring a guest!



NEW MEMBERS:

*We extend a hearty*  
**WELCOME**

STEPHANIE RAKE  
JOYCE MCGUIRE  
BOB ROSEN  
NORMA BECKMAN  
RICHARD WALKER  
RITA CLOUD  
PAUL CARLSON  
CHERYL WHALEN  
SARA JOHNSON  
KELLY & JOHN GRIFFEN  
CINDY WEAD  
DON HUBBARD JR.  
FRANK & JEAN DYLEWSKI  
STEVEN & SHERI SIMPSON  
STAN YALOF

GENEVA NELSON  
DENNIS MILLER  
JEAN CHANCER  
DENNIS & VHEREE ANN BOLZ  
THERRI NATWICK  
DAVID & PAM CENCAK  
GARY KORPI  
REBECCA RODOLFF  
T.H. & MARTHA BULLOCK  
BARBARA HECKLER  
RICHARD L. SMITH, JR.  
GEORGE LOMBARD  
JENNIFER VAN ATTA  
JOHN MICHAEL DENUNE  
CAROLYN COLLMAN

NEXT MONTH IS ESPINAS y FLORES:

Rick Latimer: "The IOS Congress in Malta"

Frank Thrombley: MEMORABLE MOMENTS - Who will it be this time?

Brunhilde Scheffler: Creative input, an article and a haiku!

M & J Buckner: "The CSSA Convention in San Francisco - Highlights"

Shirley Berry: FROM ALL CORNERS - will return in September with growing hints and other educational information.

Joe Quijada: CACTUS OF THE MONTH - The Cephaliated Genus, Melocactus.

Phyllis Flechsig: SUCCULENT OF THE MONTH - Ceropegia, wonderful stem succulents, vines, tubers, and flowers, you have to love them!

Michael Vasser: GUEST SPEAKER - horticulturalist, plantsman, and world explorer on "The Succulent Pelargoniums & Sarcocaulons of Africa".

DEADLINE FOR ESPINAS y FLORES IS AUG 25

THANKS FOR YOUR INPUT AND HELP!!

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PLEASE HELP! SUPPLY OUR REFRESHMENT TABLE WITH GOODIES!



## MILESTONES

With much sadness we note here the passing of our esteemed member, Bud Aubuchon, plantsman, sportsman, and friend. Our thoughts and blessings go out to Mary, who along with her husband were the editors of Espinas y Flores for over ten years. Goodbye Coach .....

Another sad note: Helen Hegyi, longtime member of the San Diego and the Palomar Society and a keen horticulturalist passed away this July. She was spunky and articulate with a distinct and proper accent to her plant pronunciation. There will be no service or memorial. Donations to the Palomar Cactus Society or SDC&SS in her name - please contact Sue Coombs 745-4563.

Also, the plant world, especially we cactus & succulent enthusiasts will be much poorer with the loss of Lyman Benson, leading specialist in the taxonomy of the cactus of the world. Past President and Fellow of the CSSA, Professor Emeritus of Botany @ Pomona College - Claremont, CA and author of many indispensable reference books including THE CACTUS OF CALIFORNIA, THE CACTUS OF ARIZONA, THE CACTUS OF TEXAS, and his magnum opus: THE CACTUS OF THE UNITED STATES & CANADA.

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We have heard that Manny Singer hasn't been feeling well of late and just wanted to wish him well. Hope this issue finds you healthy and happy!!!

\*\*\*\*\*

We have a new address for Dorothy Dunn and John Pasek: "PLANTAS DEL SOL - uncommon plants for the discriminating collector, Cacti, Succulents, Baja Natives, Caudiciforms, Seed, Rocks, and Pots" - 6175 North Noel Lane, Tucson, Arizona 85743. Good Luck and let us know when you publish a catalog!

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For a real treat and a-heck-of-a-good-deal send \$20 to Linda Benziger, Tucson Cactus & Succulent Society, 4225 East Fairmont #1, Tucson, AZ 85712 for the limited edition 18" X 24" pen and ink poster, each individually watercolored and signed by the artist. This poster is a promotion for the CSSA Convention in Tucson, AZ on June 19-23, 1995; it portrays a Papago woman collecting Pitayay fruits from Saguaro. Price includes postage & handling. This is a gift! Take it from me! Only 200 in the edition so don't procrastinate - it's wallable!

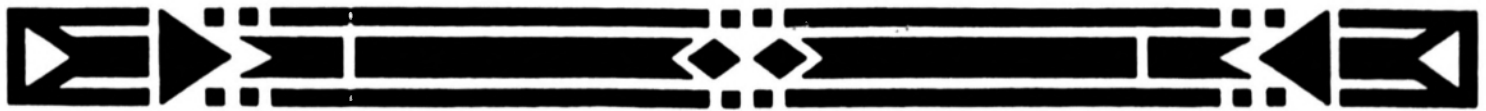
\*\*\*\*\*

We will all miss Carol Barsi, as she is retiring as head librarian after 16 years with the San Diego Museum of Natural History. But we're pleased that she will have time to pursue her enjoyment of gardening, reading, fishing, traveling and grandchildren. Congrats Carol and thanks for the kindness.....

\*\*\*\*\*

Congratulations to Marylyn Henderson! She entered two plants in the CSSA National Show @ Los Angeles Arboretum and place 1st & 2nd, as well as taking Best Echeveria perpetual Trophy. SDCSS member Joe Clements and Duke Benedon are co-chairman of this popular event held each year over the 4th of July weekend.

Marylyn is trying to make room for some new and growing additions to her collection and landscape .... So she has many surplus propagates and specimens she would like to sell. Please contact her @ 724-6595 - by appointment only!!!!



## San Diego 1997 CSSA Convention Host!

In case you haven't heard the San Diego Cactus & Succulent Society will be hosting the 1997 CSSA - National - International Convention. Michael gave the presentation to the officers, directors, and CSSA affiliates at the San Francisco convention. Two years from now the 1995 Convention will be hosted by the Tucson Cactus & Succulent Society, Chuck Hanson and Gene Joseph are coordinating chairmen. So, four years and counting!

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For the first time in the history of our organization's show & sale, we had rain in June! Since our sale is held outdoors in Balboa Park this could have been a real problem. Well, we survived it all quite well and outside of a few wet and tired workers (editors definition of worker = premium high grade quality SDC&SS member), some well-watered cactus & succulents, wet boxes, and the displacement of book sales to the inside, we are pleased to report a new record in sales. A million thanks to all who helped out - too numerous to mention here - but we all know who you are! and you know who you are!!!

**THANK YOU! THANK YOU! THANK YOU! THANK YOU! THANK YOU! THANK YOU!**

Our annual July Picnic and Rare Plant Auction at scenic Kate Sessions Park was a culinary treat with record bidding on some very special plants. Thanks to picnic chairman Tom DeMerritt and his lovely limping wife, Laura! (hope your knee is better, Laura). Also thank you all for a tremendous amount of labor -- Rick Plant!!, Joey Betzler, Joseph DePietro, Joyce Buckner and Auctioneer - Michael Buckner! Great work, lots of fun ... See you next year!!

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### QUAIL BOTANICAL GARDENS

SDC&SS member, Philip Favell recently donated 19 rare species of *Aloe* to Quail Botanical Gardens to vastly improve their already great Aloe garden. Way to go, Phil!

The red Lava rock covering the desert garden and Baja area was replaced with decomposed granite providing an aesthetic appearance according to our Quail Garden representative, Phyllis Flechsig.

The Cycad Collection at Quail continues to expand with the recent addition of *Macrozamia riedlei* and the very rare Cycas species "Idle Blue", donated by Brent Wigand, cycad enthusiast. Twenty-two new species were brought in from Loran Whitelock's Cycad Gardens Nursery in Los Angeles. These and the addition of two very large specimens of *Encephalartos arenaria* & *Encephalartos altensteinii* from Harold Lachs of Los Angeles makes a trip to Quail Gardens even more desirable. When was the last time you visited?

**KEEP US INFORMED**

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# A GREAT BIG THANK YOU TO:



M. Bahr with 14 plants entered, S. Berry with 31, J. Betzler - 11, D. Byer - 9, H.W. Buckner - 9, M. & J. Buckner - 21, J. & S. Clements - 31, A. Cornett - 10, M. Cullen - 7, T. DeMerritt - 10, C. Dykema - 19, P. Fleschig - 23, K. French - 14, S. Frost - 10, F. Gable - 3, M. Henderson - 47, Kaapit - 1, D. Larberg - 20, R. Latimer - 7, R. Lime - 7, E. Marshall - 21, B. McCowen - 3, J. Moore - 3, E. & K. Nolan - 21, J. & K. Quijada - 37, S. Schell - 19, B. Scheffler - 8, H. Stern - 2, R. Taylor - 1, F. Thrombley - 6, A. Wiess - 3, G. Williams - 17, J. Williams - 28, J. Wood - 5, M. Woodworth - 5 and a mystery entrant with three entries (no name)! Thanks to all of you for taking the time to enter your plants.

## The following people won awards for their entries:

Best Agave	Michael & Joyce Buckner	Doris Rake Plaque
Best Cactus	Joseph & Susan Clements	Phillip Corliss Plaque
Best Succulent	Marylyn Henderson	Ruby Falk Plaque
Most Artistic Display	Rudy Lime	Walter & Hazel Scott Plaque
Best Exhibit	Rudy Lime	Reuben Vaughan Plaque II
Best Educational Display	Alan Wiess	Cactus & Succulent Soc. of America Award
Best Aloe	Dorothy Larberg	Barbara Jeppe Trophy
Best Echeveria	Marylyn Henderson	Oliver & Sophie Loyland Trophy
Best Epiphyte	Phyllis Fleschig	William and Ruth Nelson Trophy
Best Euphorbia	Frank Thrombley	Lydia & Russel Evans Trophy
Best Graft	Michael & Joyce Buckner	Bob & Suzanne Taylor Cup
Best Mammillaria	Ed & Karla Nolan	Elibet Marshall Trophy
Best Mesembryanthemum	Dorothy Byer	Samuel & Adela Markey Trophy
Best Mexican Plant in Show	Joseph & Kay Quijada	Dudley B. Gold Trophy
Best Pachycaul or Caudiciform	H. Warren Buckner	H. Warren & Virginia Buckner Trophy
Best Pelargonium or Sarcocaulon	Mitch Bahr	Wilna Johnson Trophy
Best San Diego County Succulent	Joseph & Kay Quijada	Julianne Rice Trophy
Best Sansevieria	Joseph & Kay Quijada	Richard G. Latimer Sr. Trophy
Best Succulent Bonsai	Michael & Joyce Buckner	Rudy & Teresita Lime Trophy
Best Opuntieae	Joseph & Susan Clements	James & Shirley Berry Trophy
High Points - 50 or less entries	Marylyn Henderson	James & Shirley Berry Trophy
Sweepstakes	Marylyn Henderson	Dr. Ronald & Marcia Monroe Trophy



# THE EIGHTH ANNUAL INTER-CITY CACTUS & SUCCULENT SHOW & SALE

**SAT. & SUN. AUGUST 21 & 22, 1993**  
**From 9:00 am to 5:00 pm**



*An Incredible Show!*

For information please call;  
Larry Grammer 310 599-1146  
Woody Minnich 805 944-2784  
Charles Spotts 818 341-7613

AT THE LOS ANGELES STATE & CO. ARBORETUM 301 NORTH  
BALDWIN AVE. ARCADIA, CA across from Santa Anita Race track

## THIRD ANNUAL TRI-CITY SHOW BUS TRIP

Bus trip to the Eighth Annual Tri-City Show? There will be a sign up sheet at our August meeting for this trip scheduled for Saturday, August 21st. Bus departs Balboa Park (behind the Organ Pavilion) at 8:00 am and will stop at the Cal Trans Park & Ride - N.E. corner of La Costa exit off Interstate 5 @ approximately 8:30 am for our North County residents. Bus should arrive @ L.A. Arboretum around 11:00 am. We will then view what is considered the largest Cactus & Succulent Show in the world. They also have a terrific sale and the totality of the L.A. Arboretum cannot be explored in just one day. For more information call Michael or Joyce @ 222-3216. If you have already sent in your check, not to worry all these checks are being held until the bus trip - if we do not have at least 30 people, the bus trip will be cancelled. Bus trip and entry fee is \$20.00 per person with includes entry into Arboretum; bus only holds 45 people, so reserve early by sending your checks to: SDCSS, Laura De Merritt, treasurer @ address on back cover.

**Record Awards for S.D.C. & S.S. Del Mar Fair Exhibit!**  
***Xeriscape Award, Best in Class, Best Educational,  
Best Plant Specimens and Exhibitor's Choice!!!***

DEL MAR STATE FAIR - SPECIFICATIONS FOR LANDSCAPE EXHIBIT:

A SUCCULENT XERISCAPE -FOR SOUTHERN CALIFORNIA

SOIL utilized for this garden was San Diego #1 amended top soil. To facilitate better drainage for succulents, two yards of agricultural pumice was added in planting holes to a depth twice the container size. It is very important to provide porosity and prevent compactness in a succulent garden.

IRRIGATION: With uneven terrain and multiple species group plantings, it is difficult to install an exclusive drip system. To solve this problem, a multiple use system with drip line for larger plantings & more water demanding plants was installed (exposed for viewing). On separate valve, Toro shrub heads w/proper precipitation patterns are utilized throughout the garden. This garden would be irrigated once a week for sixty minutes during summer months. The drip system, one half and 1 gallon emitters being utilized on quadra-bubbler 6 gph heads. All plantings would also be watered for six minutes by Toro shrub heads one day a week during summer months. Winter watering would be non-existent except by manual operation during unusual hot winter weather (Santa Ana conditions); and then during early mornings only. A Hydorain hr 6100 6 station controller (mounted on office wall @ end of east walkway) has been mounted using 18 gauge wiring to two Hardy 3/4" valves w/proper anti-siphon cross connection devices.

Xerephytic garden has been MULCHED w/Arizona River pebble (1/4") to curb evaporation problem and to effect the "Arroyo" appearance and aesthetics. Looks good, doesn't it!

FERTILIZATION of this low maintenance succulent garden would utilize a complete (Nitrogen, Phosphorous, Potassium) fertilizer w/low Nitrogen (less than six lbs per 100 lbs of fertilizer) during the spring and early summer season only and not to exceed three applications per year.

All MATERIAL is available through specialized nurseries. Contact THE CALIFORNIA CACTUS GROWERS ASSOCIATION, 11152 Palm Terrace Lane, Riverside, CA 92505, for a free directory of relevant nurseries in your area. Join a local Cactus & Succulent Society for "Insider's Information" or your local California Native Plant Society. Xeriscape is beautiful!

A Special Thanks to San Diego Cactus & Succulent Members: Rick Plant, Susan Hopkins, Millie & Jim Williams, Warren Buckner, Anthony & Rose D'Atillio, John Williams, Tom & Laura De Merritt, Kevin Coniff, Steven Southwell, Joseph Betzler, and Michael & Joyce Buckner for all their beautiful plants and hard work. This is the third year in a row that H.W. Buckner has loaned us his beautiful *Rhipsalis* collection for a wonderful hanging garden display - an extra thank you to you, sir! Also we wish to thank C&J Cactus Nursery, Coniff Tree Farms, KCR Rock, Desert Rose Nursery - Robert Israel, Eileen Innecken of Vista Health Plan (for computer use), and Edgar Engert (Del Mar Fair Flower Show Supervisor) and his terrific staff. Xeriscape design & drawing by Michael Buckner - Good Job!!



# Mammillaria Camptotricha and Dilichothele - A History

~~THE GENUS DOLICOTHELE (K. SCHUMANN)~~

~~THE SUBGENUS DOLICOTHELE (HUNT)~~

## DOLICOTHELE - A HISTORY

by Anna Cornett

(dolicho = long                      thele = long)

The genus **Dolichothele** was created around the turn of the century by Karl Schumann for a group of small, soft-fleshed plants with uncommonly long, finger-like tubercles and mostly yellow flowers. At one time or another there have been 16 names listed under **Dolichothele**:

- |                              |                           |
|------------------------------|---------------------------|
| 1) <u>D. beneckeii</u>       | 9) <u>D. baumi</u>        |
| 2) <u>D. balsasoides</u>     | 10) <u>D. longimamma</u>  |
| 3) <u>D. nelsoni</u>         | 11) <u>D. melaleuca</u>   |
|                              | 12) <u>D. sphaerica</u>   |
| 4) <u>D. albescens</u>       | 13) <u>D. surculosa</u>   |
| 5) <u>D. camptotricha</u>    | 14) <u>D. uberiformis</u> |
| 6) <u>D. decipiens</u>       | 15) <u>D. carreti</u>     |
|                              | 16) <u>D. saffordi</u>    |
| 7) <u>D. heidiaei</u>        |                           |
| 8) <u>D. zephyranthoides</u> |                           |

The first 3 species were removed to a new genus created by Buxbaum, **Oehmea**, which was eventually made a sub-genus of **Mammillaria** by David Hunt. **M. balsasoides** and **M. nelsoni** were recognized to be synonymous with **Mammillaria beneckeii**, as were **M. hirsuta**, **M. balsasensis**, **M. M. monancistracantha**, **M. barkeri**, **M. colonensis**, **M. aylostera**, and **M. guienjolensis**. **M. beneckeii** is obviously a highly variable species which is found along the entire western coast of Mexico. Its satiny flowers are golden yellow to orange and about an inch across, and its black seeds are very large for a **Mammillaria**. **M. beneckeii** clusters freely with readily detachable heads. Since the hooked central spines cling tenaciously to passers-by, some clones are distributed vegetatively over large areas. This is not an easy species to keep alive in cultivation.

In order to accommodate the next 3 species, the genus **Dolichothele** was divided into the **Macrofloridae** (those with large flowers) and the **Microfloridae**, those with small, straw-colored flowers. **M. camptotricha** was described as having 6 to 8 long, twisting radial spines and no centrals, **D. albescens** as having fewer, shorter, and straighter radials and usually 1 central, while **D. decipiens** would have 1 or 2 brown-tipped centrals, and only 7 straight radials. Since **D. albescens** is intermediate geographically as well as morphologically between **D. camptotricha** and **D. decipiens** it was only a matter of time before they were declared to be one species, in the genus **Mammillaria**, subgenus **Mammillaria**, series **decipientes**. Thus we have only **M. decipiens** and its var. **camptotricha** remaining. **M. decipiens** var. **camptotricha** is commonly called the Bird's Nest Cactus, with cause. The species' appearance ranges from the neatly combed cultivar "Mme. Marnier" to clones which resemble Einstein on a bad hair day. These are vigorously clustering plants which steadily fill pot after pot to overflowing. While the flowers are rather insignificant to look at, their fragrance is magnificent.

## CACTUS OF THE MONTH:

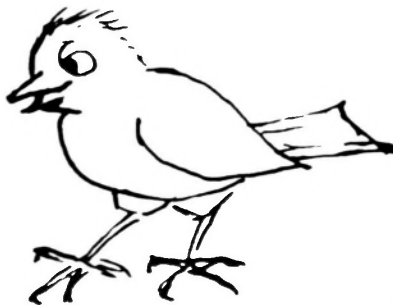
*M. zephyranthoides* is small, flattish, and non-clustering. It has 12 to 18 wispy, white radial spines and one hooked central. This is a difficult species to grow, most untypically for a *Dolichothele*, so it should come as no surprise that Hunt has removed it to the series *Ansistracanthae*, where it associates with other such finicky *Mamm* as *M. guelzowiana* and *M. schumanni*. The same was done for *M. heidiae*, which is quite similar to *M. zephyranthoides*, but is more rounded and clusters. Since it was recently discovered it spent a very short time in the sub-genus *Dolichothele*.

*M. baumi* is a compactly clustering plant with dense white spines and large, yellow, citrus-scented flowers. *M. surculosa* has similar flowers and habit, with only a few fine, needle-like radial spines and a longer, hooked central spine. *M. melaleuca* seems remarkably like *M. heidiae*, but apparently is still in this group. *M. saffordi* has been referred to *M. carreti*. *M. carreti* is a shallow-rooted, clustering plant, not too difficult to grow. It is attractive with its white radial spines and a glistening, hooked, central spine. The flowers are suspiciously different from other *Dolichotheles* - white with a rosy mid-stripe and greenish stigma lobes. *D. longimamma* is the very model of a *Dolichothele*, with its long flabby tubercles and big yellow, scented (like algae!) flowers, 1-3 straight central spines and 9 or 10 weak radials. *M. uberiformis* is smaller, more freely clustering, with stouter spines but usually no radials. These differences were not enough to keep its status as a separate species and it is now *M. longimamma* var. *uberiformis*.

Alas, even the sub-genus *Dolichothele* is no more. The few remaining species - *M. baumi*, *M. carreti*, *M. longimamma* (& var. *uberiformis*), *M. melaleuca*, *M. sphaerica*, and *M. surculosa* - have been placed under the sub-genus *Mammillaria* in the series *Longimammae*. The musical-sounding word *Dolichothele* now exists only in history and on a lot of plant labels.

### Bibliography

- Glass and Foster, 1971. "Mexican Logbook" Cactus and Succulent Journal  
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MAMMILLARIA decipiens  
~~Dolichothele~~ camptotricha  
Var.

# STRANGULAR FIGS AND ROCK SPLITTERS

## *The Genus Ficus, L., Family Moraceae*

The succulent *Ficus* species are few and far between and rabidly sought after by the Bonsai Caudicophile (is this a neologism?). For any collector interested in unusual leaf form, trunk texture, color, and oddity of shape, the addition of a succulent fig species is a thrill.

What we have available for our collections is not surprisingly the Mexican rock splitters and strangular figs, mostly the Baja and Sonoran species. *Ficus petiolaris* is the most attractive of these species and thus the most obtainable.

For the neophyte some explanation of these descriptive terms, rock splitters & strangular figs is necessary. To view the strangulars and splitters in nature is unforgettable - a remarkable experience. The seeds of these species characteristically are deposited in the trunk crotches of trees (incl. palms) by birds spilling the seeds while consuming the rich protein fruit (mostly insipid to humans) or by passing the intact shiny seeds through their digestive tracts, an added bit of nutrient and humus matter beneficial to the seedling's growth high up in the trees. The seeds germinate in the wet season and immediately send out aerial roots growing downward to search out ample water sources. The roots have a tendency to cling to the host tree growing quickly on the shady protected side of the host to conserve energy. The epiphyte has to cling or hug the host tree to conserve energy because aerial roots have more air circulation around them exposing more surface for hydro-evaporation. Economy of energy is extremely important in the infant stage, as the plant must reach a constant water and nutritional source, (more tree crotches or ground) to survive the dry summer periods.

There is no parasitism; no entry into the vascular system of the host plant, but the relationship is not-the-least symbiotic for eventually the invasive vigorous fig completely encircles its host and ultimately out-competes and strangles it. The demise of the host is of no consequence to the epiphyte, because the strangular has now built a basket work of vigorous supports, a "radical trunk" sometimes over one hundred feet high and occasionally utilizing more than one host tree to give it original support. Recent research has uncovered colonies of strangular figs fusing and sharing mutual vascular and genetic material creating massive organisms covering large areas of forestscape.

It is a different case for the rock-splitters; the seeds are deposited by animals including birds and by natural gravitational disbursement into a crack or crevice of a rock which affords the seeds and seedlings a modicum of shade and an ephemeral reservoir of moisture. Once established the roots spread into the fissure and with hydrostatic pressure are able to actually crack the rocks apart. These "rock-splitters" form huge trunks upon reaching the ground and look as if they have been melted over the tops of the rocks and dripped down over them like wax from a long-burning candle. The roots can form flanges and become very sinuous sprawling on the surface of the ground like interwoven serpents. I have seen trees which have cracked their host rocks apart and lifted huge hunks of these rocks into the air as much as six feet above ground. Sometimes the seedlings will get an advantageous foothold on a cliff and hang over, stretching far down to find meager footholds in this melted fashion and forming awesome visual sights and exclamations from lucky viewers. You Baja fishermen know what I'm talking about, as the figs love oceanic dense fogs as a water source (taken in through their roots and leaf surfaces) and hang over island and coastal cliffs best viewable from boats.

# SUCCULENT OF THE MONTH

I attempt to recreate this style in miniature in my bonsai'd *Ficus* and I'm sure that if the ancient Japanese and Chinese masters had seen firsthand these wonderments, they would have brought this form into the traditional bonsai arena centuries ago. Ditto, *Burseras*, *Commiphoras*, *Pachycormis*, *Phytolaccas*, *Adenias*, *Adeniums* and *Pachypodiums*, but accept my apology for my enthusiasm, I digress.

The genus *Ficus*, of which the most widely known and commercially indispensable is *Ficus carica* the edible fig, is known as the Mulberry Family, *Moraceae*, inclusive of approximately fifty-five genera exceeding a thousand species. In the decorative plant market, the rubber tree, *Ficus elastica*, and the contemporarily popular *Ficus benjamina*, "Benjees", are very important and literally millions are produced and sold annually.

Included in the *Moraceae* is the spectacular genus, *Dorstenia*. This genus includes the Socotran *D. gigas*, *Schweine*, that Werner Rauh calls a living "Chianti bottle", and "...among the most sought-after and at the same time rarest succulents in collections." (Rauh, "The wonderful World of Succulents", c.1979).

Seedlings and plants of the most popular *Ficus* species have become relatively easy to procure as I and others have brought in seed and cuttings. The last seed that I procured was from remarkable red veined leaf forms of *Ficus petiolaris* collected in northern Jalisco and southern Sinaloa states of Mexico and grown and distributed by C & J Cactus of Vista, California and others.

There are several well established and old trees of *F. petiolaris* around San Diego and the largest is four and one half feet across at the base and approximately thirty-five feet tall planted in the nineteen fifties by Larry Hunter of Hunter's Nursery in Lemon Grove, where it occasionally gets frost but seems unaffected, outside of just partially and temporarily deciduating. This specimen has grown upright, not in the melted tree fashion, as plants under artificial cultivation tend to do. This plant is also larger than any I have ever seen in natural habitat.



Photo from Menninger Fantastic Trees

Florida's strangling fig (*Ficus aurea*) starts life as a seed in a crevice of another tree, and eventually envelopes and kills it. Here the host tree is a silk-oak

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Just four pillar roots under one of the branches of the banvan tree on the Thomas A. Edison estate at Fort Myers, Florida

# Strangular Figs and Rock Splitters

Listed below are the ficus species which are presently in private collections and rare plant catalogs, some easily obtainable and some extremely scarce. There are many species of rock splitters and epiphytic strangular figs in Africa, but with no distribution of seeds or cuttings they will remain unavailable to collectors and gardens, a shame!

## MEXICAN SPECIES:

*Ficus palmeri* Watson - Rock fig from southern Baja where it grows on sheer cliffs above the sea and in rocky canyons. Also found on several Baja Islands; drought resistant, excellent bonsai material; available commercially.

*Ficus brandegeei* Standley - Rock fig from cape region of Baja where it grows on sheer walls and cliffs. Scarce, excellent semi-succulent bonsai material.

*Ficus petiolaris* HBK (Humboldt, et.al.) - Lava fig from southern Sonora south to Oaxaca. Rock splitter growing on dry slopes and cliff faces. Beautiful cordate leaves with prominent red midribs and tufts of white hairs on lower leaf surface, petioles stipend. Common in cultivation because of its beauty; excellent semi-succulent bonsai material with its scurfy whitish yellow bark.

*Ficus radulina* Watson - Sonora to Chihuahua, prominent veins on elliptical leaves with a rounded base. Occasionally available, good bonsai material.

*Ficus goldmannii* Standley - Rock splitter with buttress roots from Sonora to Costa Rica. Rare; can get huge with banyan like aerial roots.

*Ficus cotinifolia* HBK - Sonora to Central America. Strangular fig growing often as epiphyte and tree killer. Buttress roots making the plants wonderful bonsai subject matter; prominent aerial roots, orbicular leaves with prominent veins on lower surface. Rare.

*Ficus padifolia* HBK - Strangular fig, with lanceolate leaves called "Matapalo" in Mexico, meaning "Tree Killer". Can become banyan like with many aerial roots. Sonora to Central America. Excellent bonsai material. Rare.

*Ficus* species "Burl Mostul", BLM 0184 - in his current availability list, from La Huerta, Jalisco, Mexico, with lanceolate pointed leaves (?).

## AFRICAN SPECIES

*Ficus cordata* Thunberg - Namaquanum fig, Cape Province, wide spread rock splitter; leaves are heart shaped, small brown-purplish decorative figs, many aerial roots making good bonsai subject. Rare, but available.

*Ficus ingens* Mildbread - Transvaal rock splitter with young leaves red; tree established at Huntington Botanical Gardens. Rare.

*Ficus sonderi* Miguel - Sonder's fig, rock splitter from Natal and Transvaal, found on rocky knolls, develops conspicuous fat tapered trunk at early age making it excellent for training. Rare.

*Ficus sycomorus*, Linne' - Throughout South & southwest Africa, but probably originated on Arabian Peninsula. Trees with much trunk fluting & buttressing. Rare.

*Ficus capensis* Thunberg - Synonymous with *Ficus sur*. South Africa, large almost oval bright green leaves. Cauliflorous fig bearing the fruit in large clusters from the trunk. Questionable bonsai material, but is available occasionally.

*Ficus natalensis* Hochstetter - Natal fig, reddish bark and dark green ovate leaves, ornamental and handsome tree; planted along streets of Capetown. Can be a strangular epiphyte making it bonsai subject. Rare.

*Ficus illicina* Sonder - Rock fig of southwestern Africa. Small species; excellent for bonsai. I have only seen in the succulent collection under the care of John Trager at the Huntington. Extremely rare.

# The Genus *Ficus*, L., Family *Moraceae*

## SPECIES AVAILABLE FROM OTHER AREAS:

*Ficus aspera* Forster - Mosaic fig or clown fig, usually found (when possible) under the name *Ficus parcelli*. I include it on this list because it is so remarkable in its variegated green and pink and white leaves and variegated red figs. Interesting and collectable, but not a bonsai subject; more a patio tub shrub that always get attention. Probably, originally from Australia. Rare in cultivation because it is tender. I have distributed from cuttings. Rare.

*Ficus socotrana*, Lavranos - Recent (15 years) introduction from Indian Ocean Island, Socotra. Excellent bonsai - forming heavy trunk and rock splitting character early. Extremely rare, distributed by myself from cuttings of Newton-Lavranos original plant. Deciduous in winter.

*Ficus pseudopalma* Blanco - Non-succulent and not bonsai material, but so distinctly different as to deserve comment. Native habitat in Philippines and very tropical, thus tender. The leaves of this species grow at the end of the unbranched stem, making it look like a palm tree. Weird but difficult to grow. Occasionally re-introduced. I have not been very successful with it, having lost two relatively expensive plants. Very rare.

*Ficus aurea* Nuttall - Florida strangular fig. One of the two figs native to the United States, the other being *Ficus citrifolia*. *Ficus aurea* is an epiphytic strangular with yellow (aurea) figs when ripe. Should be more available, but it is not. Let me know if you have it!

*Ficus watkinsiana* Baily - A massive buttressed tree from Queensland Australia, that grows in the habit of *Ficus macrophylla*, the giant of Balboa Park, San Diego, and Santa Barbara. According to Veitch, "The huge roots of this species, standing out like solid slabs at the base, sufficient to hide half a dozen men, gradually curl up (strangle) the largest trees till they completely envelope and finally destroy them." The plant in my collection is taking to bonsai training successfully. It came to me as a cutting from a tree grown in the ground at Tropic World by Paul Hutchinson.

*Ficus religiosa* Linne - One more unusual tree which just happens to be my favorite (non-succulent), not a bonsai subject but a fine street tree with wonderfully shaped leaves which have long tapered tips. This is the sacred "Bo" or "Peepo" tree which was planted in 288 B.C., with a continuous record kept of the tree and the successive steps taken to preserve it. This makes this tree the oldest historical ornamental tree known. In India, this tree can grow as a strangular.

## FICUS SOURCES:

Abbey Gardens Cacti and Succulents, 4620 Carpinteria Ave,  
Carpinteria, CA 93013; (805) 684-5112.

Northridge Gardens, 9821 White Oak Ave, Northridge, CA 91325;  
(818) 349-9798.

Rare Plant Research, Berl Mostul, 9527 - S.E. Wichita, Milwaukia, OR  
97222.

Tropic World Nursery, Paul Hutchinson, 26437 North Center City Pkwy,  
Escondido, CA 92026; (619) 746-6108.

There are, of course, many hundreds more of *Ficus* species but these are either ornamentals, or unavailable to the collector. The species mentioned all have value to the collector of rare and or unusual succulents and bonsais.

For more information on the flowering, fruiting, and pollination of figs as well as other characteristics which are not the scope of this article, please review:

A Synopsis of The Genus *Ficus* (Moraceae) In Southern Africa, J.V. Van Greuning, *Journal South African Botany*, vol.56 #6, Dec 1990.

Fantastic Trees, Edwin A. Menninger, Viking Press, Inc., c.1967.

Ficus: The Exotic Species, Ira J. Condit, U of CA, div of agricultural sciences, 1967.

Flora of Baja California, Ira L. Wiggins, Stanford University Press, c.1980.

Trees of Southern Africa, Eve Palmer & Norah Pitman, A.A. Balkema, Cape Town, three volumes, c.1972.

Trees of Southern Africa, Keith Coates Palgrave, G. Struik Publishers, Cape Town, two volumes, c.1997.

Vegetation and Flora of the Sonoran Desert, Shreve & Wiggins, Stanford University Press, two volumes, c.1964.

The Wonderful World of Succulents, Werner Rauh, Smithsonian Institution Press, Washington DC, c.1984.



Espinas y Flores is proud to introduce Stan Yalof and J. Reese Brown, members of the Palomar C&S Society, in their combined energies, writing "Those Sexy Succulents." It is interesting to follow the progress of an idea and its final results; these articles are the fruition of ideas created by a hapchance social situation: the Living Desert Bus trip in May. Stan & I sat together on the ride over and in the course of the conversation (we're both talkers) I mentioned my plans to have some fun with the editorship and try to do something a little bit different, a little bit self amusing and indulgent and a little bit controversial - a take-off on the National Lampoon's Annual "Summer Sex" issue. Stan was delighted with the idea and the challenge, and with a keen mind and an attentive ear (and mouth) we hashed out some ideas. Thanks Stan and Reese for this creative enterprise!

# Those Sexy Succulents

## by Stan Yalof and J. Reese Brown

The sign on the door read  
"Dr. Quenton Xerophyte,

Psychotaxonomer." I walked into a waiting room. The wall was covered with diplomas and a fruitcake sign in a roccoco frame that read "Fungi Pride". I almost backed out except I needed help bad.

"You're on-time, well don't stand there, come in!" wafted a gruff voice from the next room. In I went, expecting an office. Instead, I found myself in a greenhouse crowded with plants. "You're a little early", came a voice from a hammock strung between two large Aloes. "Take a scat and tell me why you need my help."

Thanks for seeing me on short notice, Dr. Xerophyte. I think I'm going insane.

Oh?

This may sound fantastic but I believe that in some past life I was...

I hope you're not going to say Napoleon or Julius Caesar.

None of those. In my past life I dreamed I was a plant, indeed the plant King.

Oh, is that all. Nothing to worry about. The Greeks had people changing into oaks, willows and narcissus. Nowadays, people imagine that they are reincarnate of kings, duchesses and lords, what we call the Shirley McClain effect. What I wouldn't give to meet somebody ordinary, like Louis Quatorze's gardener. But I digress. You are not alone. There are a small, but convincing group of us plant descendants. You have no cause for alarm.

But Doctor, in these plant dreams I have the most unusual, unreal fantastic sexual fantasies... not only in color, but sometimes in smellovision. But how could I? Plants are so passive.

Ho Ho Ho. Dear boy, plants practically invented sex, and lured 90 percent of the planet's biomass to respond to their blandishments. Humans have cataloged some 3 dozen sexual techniques; plants have several thousand.

Wow. This is news to me.

That's because we primates, along with the birds, are sight and sound creatures. We can't conceive of anything else. Most of the world moves 90 percent through a highway of smell signals, with landing signals sometimes provided by colors and patterns. And these color flashes are not only in the visible spectrum, but outside our vision in the far infra-red and the ultraviolet. Plants changed the world with their aromatic come-hithers: chemical 911 signals to insect protectors, perfumes to draw the gatherers, the rewards of nectar... ah, ambrosia.

You seem wrapped up in this, Dr. Xerophyte.

It is personal. An ancestor was ...but we are here to resolve your own anxiety about your botanical past. Why don't you lie down on this compost bed that I keep in my office. Comfy? Good. Now, scientifically speaking, the purpose of sex is not merely to produce offspring. You can do that with a one parent system, like an amoeba and some froggies (parthenogenesis). There are biological advantages in mixing the genes of two parents from different populations. Diversity is magnified, leading to possible improved adaptations, and destructive traits are suppressed and eventually bred out of existence.

By diversity do you mean that the little plantlets have differences if you wait a long, long time. I've never seen any important differences.

Oh they all look alike to you! Believe me, two plants are no more alike than two people, and I would add handle their mating unions more intelligently and imaginatively. To encourage these genetic unions plants have evolved come hithers: nectaries, perfumes... some would be foul to us, but to a bat or a carrion fly, heavenly! Their invention is enormous: petals that are shaped like a female of the species, tender traps that hold until the victim is basted with pollen, colored landing fields, flowers shaped to fit a bat, a hummingbird, a particular insect. Two related species can coexist because they attract different pollinators. But, I'm digressing.

Doctor, I'm really interested in learning more about those thousands of sexual methods that plants have.

All in good time, my boy. Let's go back, back to you as a plant, now you are a seed, back further to the ovary and the anther that begat the seed, and further to the flower at anthesis, its peak opening at full color.

I'm there, Doctor.

Good. Now one step further. The year is 100 million BC. You are that flower's ancestor, the beginning of Class Anthophyta, the flowering plants with their covered seeds, what we call Angiosperms. Are you there?

It's morning, a shoal of earth, sediment from a flood plain, an unstable place settled by a young, rapidly evolving, opportunistic plant. It's my ancestor, tough and scrappy, able to take a beating, small and shrubby. To get away from wasteful wind pollination, I've invented a flower system for insect pollination. And here comes a beetle. Yoo hoo, I've got pollen for cross pollination. Oh goody, it's coming over... my first customer.

Very interesting. You anthophytes were able to set seed in a season, were able to withstand a lot of physical damage, and weren't profligate with your pollen like those windblown cycad and conifer pollinators. Did you know that they throw 200 hundred times the pollen that you make to the wind? But it sometimes works out in a grove. Some anthophytes like Oak trees have returned to the wind.

Why, Dr. X?

It's not all flowers and honey to attract animal pollinators. It is an essential but uneasy alliance. We can't let our flowers be destroyed by visitors, or be highly nutritious. We get hit, but we hit back.

But plants are so fixed, so ... planted.

They have their ways of armament, like a battery of toxic chemicals... Did you know that most of our spices are insect repellants of various flowering plants? And they can call on allies!

Allies, like NATO?

Just like calling 9-11. But let's return. Concentrate on your ancestors. Were any of them xerophytes? Just curious, my name and all.

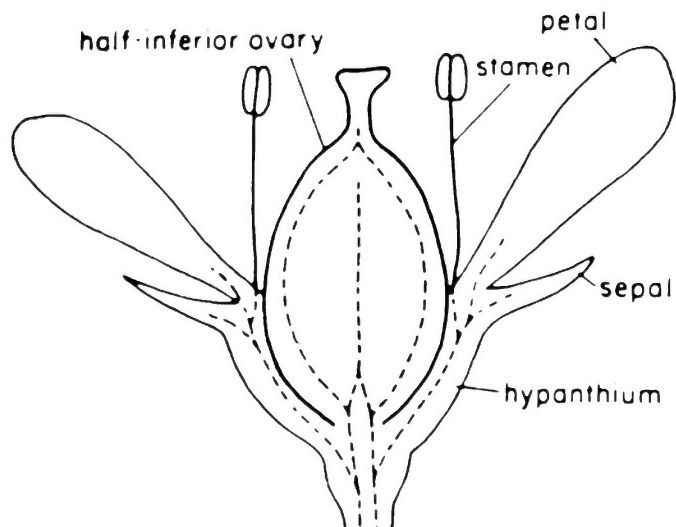
Yes. I'm in a midst of them. Hey! I didn't know that they could talk!

Quick, what are they saying?!



## Those Sexy Succulents Stan Yalof and J. Reese Brown

I'm thinking out loud. The sun was beginning to warm my flower's hypanthium (a disc shaped structure that surrounds the ovary, and to which sepals, petals, and stamens are attached) I whispered MiMoSuPa, the time has come. The plants around me whispered back:



MiMoSuPa

Minerals-moisture-sunshine-partner & relationships ne-  
partners-relationships;  
Tempered by stress  
Allowed to evolve in isolation  
Molded by climate  
hot and cold  
Moisture's forgetful gaps  
living on a bit of fog  
Frying sun  
in moderation, a blessing  
in excess, death  
Here come the wind,  
fierce and drying  
Our roots taking territory  
but allowing non-competitors space.  
Minerals, mining, concentrating  
Phosphorus for ATP, photosynthesis  
Squeeze it out, If I'm short don't flower.  
Competition for relationships  
Animal partners  
Defenses against animal foes  
We grow.

Quite a conversation. Anything else?

The sun was warming my hypanthium. I was going for sex today. It's not easy. I'm going through the checklist with my parts.

Powerplant can we make a flower run?

Just barely.

What are we low on?

The usual, phosphorus. Flowering is a drain on our sap. Peyote (*Lophophora Williamsii*) shuts flowering down 15 minutes after pollination. Phosphorus supplies almost all our energy in the form of ATP and photosynthetic phosphates. We engineers got a saying, "If you got phosphorus, you're prosperous." The roots have got their mycorrhizomes out doing their best to concentrate some more.

Mycorrhizomes, that's fungus talk! You mean root hairs! And why do you have to concentrate it?

OK, you want technical, you got it. Carbon, hydrogen, oxygen, nitrogen (courtesy fungal rhizomes) ...no problem getting them. But we got problems with three minerals: phosphorus, 0.12% in the soil, we need 0.71% to be a full service plant, so we gotta concentrate 5.9 times. With sulfur we concentrate 2 times. With chlorine, 1.5 times. So you can see that phosphorus is the bottleneck. Wait, the roots are signaling OK. We can continue the countdown.

Thanks, Powerplant. This is my first flowering. Anther, is the pollen ripe for shedding?

Roger.

Petals at your largest and brightest?

Roger. Cells are dripping with anthocyanin (Cacti would substitute betalain).

Odors?

Most intense, Chief.

Nectar glands?

Secreting.

Neighbor plant's flowers

1-hour to anthesis (full flower expansion).

OK. Signal that we'll also be open for sex in 1-hour.

Chief. Unfriendly chewing object crawling up the stem.

Damn, not now! Release terpenes, and pray!

I was a newly hatched wasp, but with a long needlelike ovipositor, wondering what to do when the signal came... a scent, one molecule was all it took, and I was off, down the highway of odors, and then a new odor flashed. There it was, dead ahead, a caterpillar. I landed atop, thrust home I buzzed, and planted eggs. It was writhing mad and off it fell. Nearly squashed me.

That was close. Some insects are needed, others we can do without.

From the beginning, our alliance with animals, even pollinators was difficult. The first flowers had clumsy and indiscriminate beetle pollinators. They broke the flowers, ate the stamens...terrible. Then we started controlling them. First we supplied nectar. Some flowers started closing on them, trapping them for hours. As we evolved, we became increasingly selective as to who with, how, and when we would pollenate. Pollinators also became specialized for a particular flower and the traffic between its kind. Not only insects, but other animals became important to our survival.

Let's continue the countdown to anthesis.

Hey, one more question. How did the anthophytes adapt their floral sex life to be more advanced?

We began to downsize the flowers and shape them with say narrow tubes and cones which allowed entrances only to tongues. We then went down two main lines of specialization: inflorescences of relatively few large showy flowers befitting large pollinators, and, like us Compositae and I hear Euphorbiaceae, we showcase small and numerous flowers with an array of little nectar cups, none of which is filled to satisfaction, making them do a lot of visiting.

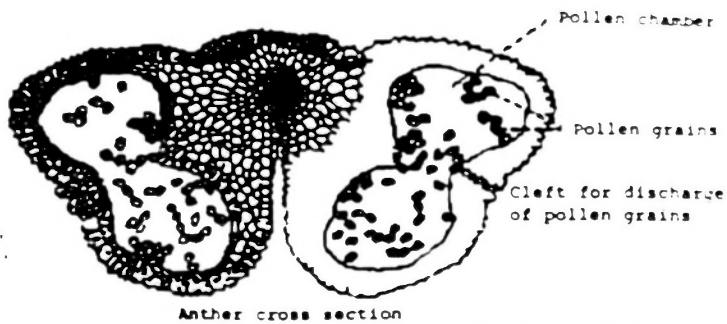
Here comes a pollinator at 4 O'Clock. Chief, why does he come here, and not to our neighbor?

## Those Sexy Succulents

Stan Yalof and J. Reese Brown, Palomar Cactus & Succulent Society

That's a different species. Looks similar, similar traits, but that don't matter. What counts is that somehow a group occupying our territory evolves a different sex attractant, flowering times, and other traits that prevent interbreeding. There are plenty of pollinators to go around. We became partners with a specific insect eons ago, and evolved together. The insect world exploded in biomass variety to serve us. We created the social insects, bees and ants.

Anther, that bee has just landed.



I just dusted him with spore as he headed for the nectar.

Don't ever say spores. That's lowly fungi talk.

I forgot. Stigma, get ready to latch onto some spores, damn, I mean pollen. His baskets were loaded when he landed. Of course your stigma is sticky.

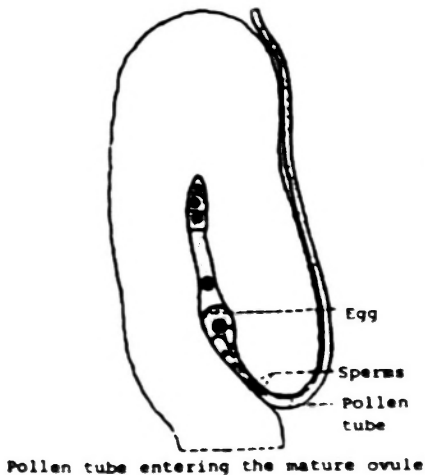
Got em on my lobes. The pollen has landed. I can feel their tubes growing, reaching toward my ovary. The pollen tubes are burrowing through the stigma into the style tissue, digesting its way through the style to my ovary cavity. The tube is being directed by its nucleus to my nearest female ovule. It found its micropyle opening. Two spores ...

Spores!!!

Oops, 2 male gametes are passing through the tube, they ruptured through the tip, through my micropyle, one joins my egg... it is fertilized, and the second is fusing with another part, the polar nuclei. Other pollen tubes are coming in. I'll direct them to penetrate the other ovules.

How long will we stay open for pollenators?

A day, at most two.



So short?

Short! Many wild succulents have a one night or one day stand, waxy flowers an exception. Peyote (*Lophophora williamsii*) shuts down 15 minutes after pollination. Remember, we are Xerophytes! MiMoSuPa!

Dr. Xerophyte, where am I?

Rest easy. You've returned.

Why were they so down on fungi?

I can answer that. You see, every plant owes something to the plants that came before. Ancient algae fused into chloroplasts, and my fungi ancestors taught the roots their trade, and the anthers, and the pollen tubes... they look just like the mycelium of fungi. Soil is dead without rhizomes.

If you were to examine the first few millimeters of ground, you would find fungi rhizomes hard at work creating nitrates. And, scratch a lichen, and you'll find a pad of fungi. Oh, I could go on, but suffice to say that life rests on a fungi biomass. Plants may sniff at their origins, but I am proud and it is fun to be descended from fungi.

Why two spores in each pollen grain? Why a polar nuclei?

Very clever of the anthophytes. I'll give 'em that. The first spore fusion creates a fertile seed, the second starts the endosperm, for sustenance during growth, and the two are wrapped in a seed covering and dispersed to the fates. The Gymnosperms produced endosperm food for all ovas before hopeful fertilization. Wasteful! With the anthos, only if it is a done deal. And did you feel that the anthophyte sex act is similar in many ways to how mammals procreate. A good analogy also between the womb and the seed. Indeed, the age of mammals and the age of anthophytes ran concurrently.

Fascinating!

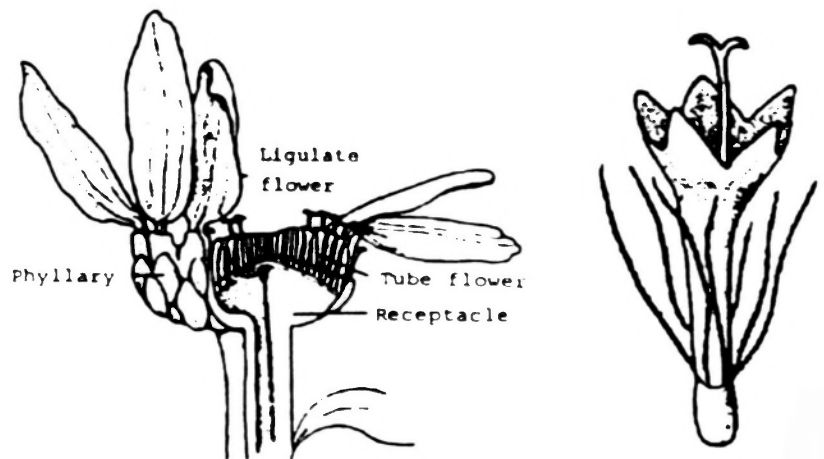
By the way, what kind of plant was your ancestor?

Oh, it was a succulent and had daisy-like flowers.

Probably Senecio, Order Asterales, Compositae family. Very modern, very efficient, very arrogant... always boasting that they are the highest of all dicotyledon families...they are recent, have fewer flowering parts, and they are tough. They supply a large portion of roadside weeds. They have organized numerous small flowers into a head so compact that it resembles a single flower, surrounded by a single large ray of petals. The outer row of small flowers within the head...what we call florets. Each floret is actually a little flower, its 5 petals united, its two lobed stigma protruding, and 5 stamens surrounding the style. Insects can't miss. And if they do, the florets can lean against each other as the flower expires and manage a less desirable inter-floret pollination. Euphorbiaceae family plants with their dioecious sex tricks manage something similar.

I'd like to hear about that.

I normally don't share patient's records, but I don't think Reese Brown would mind. He came from a long line of Euphorbias. Ah, here it is... a transcript of one of our juicy, in a professional sense, sessions. Now keep this in confidence!



# The Sex Life of Euphorbias

## As told to Dr. Xerophyte by J. Reese Brown

Euphorbias have a strange and varied sex life. It ranges from semi celibate to wildly promiscuous with a bent toward polyandry. This is all brought about by the varied and different structure of the flowers.

The flowers of the Euphorbia are born in a complex structure called a cyathium (see the drawings to the right). This starts with a cup like appendage, the involucre, that surrounds the actual flowers. The involucre bears a series of nectar glands (usually 5) around the outer rim and (sometimes) bracts at the base. The flowers themselves grow out of the center of the cup and are found with a variety of combinations. Some species are unisexual in that they have only male or only female flowers in their cyathia. Others are bisexual and have some cyathia with both one female and many male flowers. However, often these same plants also have some cyathia with only male flowers. A commonly encountered cluster of three cyathia with a mixed sexual orientation is called a cyme.

The seeds of the Euphorbias are born in a triangular 3 celled seed capsule. It always contains 3 seeds which are broadcast widely as the capsule ripens. This occurs as the outer shell hardens, shrinks, and then pops open. To collect the seed, the seed capsules should be covered with a collection screen. This can be made from window screening or an old woman's stocking.

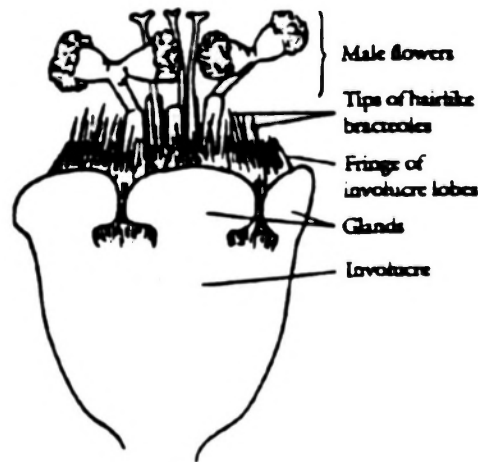
Of the succulent Euphorbias from Africa, the plants in the peduncular spined group (e.g.: *E. polygona*, *E. horrida*, *E. mamillaris*) are unisexual. Species from the stipular spined groups (e.g.: *E. ingens*, *E. echinus*, *E. Knuthii*) and the leafy Madagascar species are normally bisexual. Species with the unisexual flower arrangement are called dioecious meaning "two houses". This is because two plants (houses) are required to achieve pollination and therefore seed. The bisexual species are called monoecious meaning "one house" as one plant (house) contains all that is necessary for pollination.

The presence or absence of both sexes in one plant tells only part of the tale. Some of the bisexual species are self fertile. That is, the female flowers on a given plant are receptive to the pollen from the same plant. This is normally the case with the stipular spined species such as *E. Groenwaldii* and *E. ingens*. Others, however are not self fertile and pollen from a different plant are required for pollination. *E. millii*

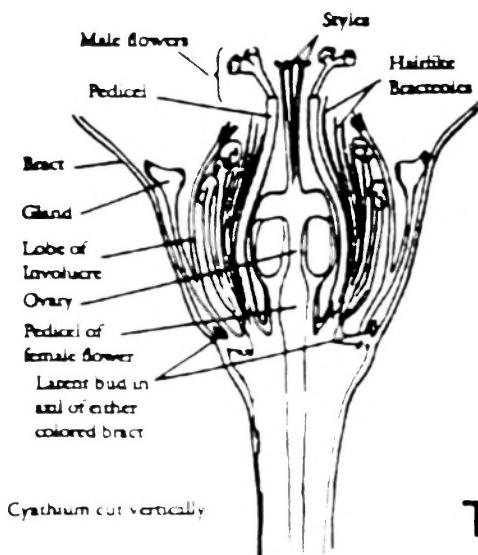
and *E. lophogona* are examples of this class. I suspect that the lack of receptiveness also applies to clones from a common original stock. I have two plants of *E. capsaintmariensis* that I have attempted to cross pollinate with no success. I suspect that they both came from the same original imported plant by vegetative propagation.

The female plants from the peduncular spined group, which are always unisexual, are receptive to any stray grains of pollen that come along and are always producing mongrel (hybrid) seeds that grow readily and produce equally mongrel and unidentifiable plants. These hybrid plants are often very attractive, and as a result, are to be tolerated despite the confusion that they create to the true Euphorbia students and lovers. This same problem was created intentionally by Mr. Edwin Hummel of Carlsbad with his large number of hybrids of the Madagascar species. The "Hummel Hybrids" were made using the various varieties of *E. Millii* and *E. lophogona* though the actual lineage has long been lost (if it was ever recorded). Despite the confusion, the Hummel Hybrids are desirable plants, both for their plant and foliage form and for their continuous production of colorful flowers.

As a result of the varied and often capricious nature of the sex life of Euphorbias, some species are best propagated by vegetative means only. Others can only be propagated sexually using seed. For these, extreme care must be taken to insure that hybrid seed are not created. There are others that can be propagated vegetatively but the resultant plants will never obtain the true form of a seedling plant. This is particularly true of the caudiciform species. For example, a rooted arm from *E. Groenwaldii* will never produce a caudex; it will always be just a rooted arm cutting. In contrast, a rooted arm of *E. ingens* will have all of the characteristics of a seedling plant. Each species must be considered as a separate case.



Cyathium with bracts removed.



## Those Sexy Succulents

"Dr. Quenton Xerophyte

"Fungi Pride"

## Agave Sex as reported by Stan Yalof and J. Reese Brown

Boy, Dr. X, growing up as a euphorbia, what with those unusual dioecious flowers, ...well I must say, it's a different sexlife. You must get, ahem, some curious cases.

Indeed I do. Here's one with two previous lives: as a medieval noblewoman named Lady Eilidh of Oak Land, and as a big blue agave. Professional ethics prevents me from giving you her current name, of course.

Shirley McClain cant top that! The two together must have created conflicts!

I won't comment on the noblewoman regression, but as to the agave, she has literally gone bats. Let me explain. Agave flowers remain open for several nights, switching from the production of pollen to the production of nectar. Pollen is produced by the stamens, the male parts of the flower. During pollen production, the female part of the Agave flower (the pistil) is not fertile. During nectar production, no pollen is released and the pistil is fertile. This kind of high up, night blooming flower attracts flower-visiting bats. In return for a very small sip of nectar, the visiting bats get their heads and shoulders covered with pollen...

...and in going from flower to flower to fill their bellies, the plants get cross-pollinated...

...maximizing genetic variations and plant vigor. To put a further spin on this, Madame Blue Agave opens only a few flowers every evening, obliging the bats to move between many plants to swig enough nectar. Since nectar is basically sugar water, carbohydrates, bats have to seek their protein elsewhere. Some get it from insects, as pollen is tough and difficult to digest, but Sanborn's Long Tongued Bats get their protein from pollen. They forage in flocks of at least 25 bats. Each visits a flower with it's long snout and long tongue for about 0.3 second. Over a night they need about 4 grams of nectar, about 60 drops. They really have to hustle! And they gulp down some pollen.

You said it was hard to digest!

Ah, another of wonderful Gaia's adaptations. After a period of flower visits, the bats hang together in a cluster and groom one another. During the grooming they ingest some pollen and also drink some of their urine. This creates stomach acidity which makes the swallowed pollen digestible.

Madame Blue Agave must love those bats!

Oh indeed she does, a true chiropterophily, which means bat lover, a name given to the syndrome of bat-pollinated flowers. Chiropterophilous flowers open at night, are pale or reddish in color, and are strong smelling. And they have to be strongly built and big enough to be bat shouldered.

Those bats really perform a service to Madame Blue Agave. I hope she appreciates..., is chiropterophilous about it.

Oh she does, as do some other succulents. Nectar-feeding bats often have to make long commuting flights to the plants they visit. Near Hermosillo in Mexico, some Lesser Long-nosed bats roost by day in caves on an island about 25 km off the coast. Some fly nightly to the mainland to visit the flowers of organ Pipe and barrel cacti. The energy spent in the commute is paid for in the nectar collected in visit's to just seven flowers. It took millions of years to develop this keystone partnership. If it were to end, it could be the end of Cactus Country. At some point, we would pull the key keystone and the planet would just turn up it's roots and die.

Aren't you exaggerating just a bit, Dr. Xerophyte?

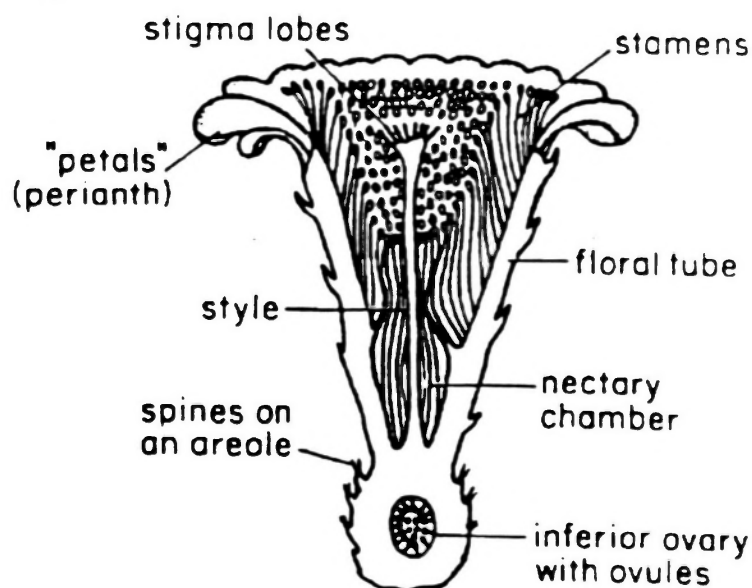
Maybe, Maybe not! Why trade an experiment for the chance of losing a planet? Suppose they built a resort on that island. Bats require solitude. Would they stop calling? Populations are so easy to destroy. It's terrible how bats are treated ...they're so wonderful, so necessary ...

Hey, don't cry Dr. X. I'll publish our conversation in the Cactus Journal. Maybe it will convert a few to chiropterophily. And thanks. Before I leave, can I give you a hug?

Of course. And tell your friends to have pride in being a plant, pride in the glories of succulent sex with the creatures of the planet, just as I have my fungi pride.

### References:

- Bats, M. Brock Fenton, Fact's On File, Inc., 1992
- Cactus Primer, Gibson and Noble, Harvard Press, 1988.
- The Life of Plants, E. Comer, U. of Chi. Press, 1981.



The organ pipe cactus (*Lemaireocereus (Stenocereus) Thurberi*) has a typical bat-tough flower, with a broad opening. The saguaro blossom (*Carnegiea gigantea*) is of similar construction.

## SEXUAL REPRODUCTION

### "The Birds and the Plants and the Bees"

by Michael Buckner

Most all plants, approximately ninety-five percent of all the plant species on Earth are hermaphroditic, containing both male staminate and female pistillate sexual organs on the same plant. The remaining five percent of plant species are dioecious, meaning that they are unisexual, male plants producing pollen and separate female plants producing only ovules which upon successful pollination later bare the progenal seeds.

Many of the hermaphroditic plants on earth are not self fertile. Self fertilization is generally regarded as disadvantageous, even in the higher plants. To accomplish cross fertilization several schemes have evolved. The most successful scheme is to have the male and female of parts of the same flower, or of the male and female flowers on the same plant, to mature at different times. *Pelargoniums* are a good example of this cross pollination scheme, as Geranium pollen ripens at different times, insuring that there are many successive insect pollinators visiting the flower and then only after the last pollen grain is shed will the stigma become receptive to receive pollen grains from other Geranium plants nearby, guaranteeing cross-fertilization.

The benefit of cross-fertilization is obvious since outbreeding increases the gene pool and assures genetic diversity. Dual heredity ensures greater stability and adaptability to the constantly changing environment. Even if reproduction were solely asexual the earth would still be populated by genetically distinct and hereditarily changing organisms. The problem with "selfing", direct inheritance from the same uninterrupted line of generations, is that genetic change is slowed, infrequent, and entirely dependent on the rare occurrence of mutations.

Compared with asexual reproduction, the development of the sexual process in prehistory offered an immense opportunity for the diversity of life, a quantum leap of biospeciation as genetic recombination greatly accelerated the rate of evolution of species on earth.

In the age of the Gymnosperms, when the Cycads, etc. were ubiquitous on earth, fertilization of these primitive seed plants was entirely dependent on the wind and rain for dispersal of the male pollen. In the classic "Egg or the Chicken First?" scenario, flowering angiosperms arose concurrently with the first flying and crawling insects. Plants took full advantage of this new method of pollen dispersal and rapidly changed to lure these pollen taxis' to them. They also evolved methods to discourage the less efficient pollinators and the nectar robbers in many varied ways.

Thus through rapid evolution flowers developed nectar secreting glandular ducts, bright coloration with contrasting nectar guides and ultra-violet wave-length enticers, magnificent alluring "Green Flag" fragrances, edible petals, bracts, and flower parts with shapes desirable to their pollinators - even going so far as to mimic the insects female sexual partners. In the evolution of life fertilization of species was soon being carried out by anything that could fly: moths, butterflies, birds, beetles, flies, wasps, and, of course, the bees. Yes, "the birds and the bees." These arthropods then received the rich protein sources of the plants in the classic of all symbiotic relationships, food and energy source for distributing pollen from male pistals to female stigmas - sexual reproduction that was assured of a greater gene pool. Whew!



## TENTH SUCCULENT PLANTS SYMPOSIUM

### Program                      Hybrids, Cultivars, Mutants                      Other Events

- *Aeonium Hybridization and Selection*  
**John(Jack) Catlin**, La Cañada, California
- *New Trichocereus and Adenium Hybrids*  
**Mark Dimmitt**, Arizona Sonoran Desert Museum, Tucson, Arizona
- *Epicacti: A Case of Questionable Origin*  
**Rudi Dorsch**, Houston, Texas
- *Noteworthy Natural Cactus Hybrids of the Southwest*  
**Dave Ferguson**, Mesa Garden, Belen, New Mexico
- *Naming and Registration of Hybrids and Cultivars*  
**James P. Folsom**, Huntington Botanical Gardens, San Marino, California
- *Succulent Selection from Hummel to Wright*  
**Paul Hutchison**, Tropic World Nursery, Escondido, California
- *Crested Plants and Monstrose Flowers: Notes from the Laboratory*  
**Elliot Meyerowitz**, California Institute of Technology, Pasadena, California
- *Bigger and Better Echinopsis Hybrids*  
**Bob Schick**, Northridge, California
- *Huntington and ISI: Three Decades of Succulent Introduction*  
**John N. Trager**, Huntington Botanical Gardens, San Marino, California

- Succulent Plant Sales
- Silent Auction of Rare and Unusual Plants
- Tours of the Desert Garden and Conservatory
- BBQ and Special Anniversary Drawing at the Director's Home Saturday Evening

#### Time:

Continental breakfast and registration start at 8:00am. Programs from 8:45am until 6:00pm will include speaker presentations, silent auction, garden and conservatory tours, refreshments, lunch. Optional barbeque with prizes.

#### REGISTRATION

Symposium	\$60.00
Saturday Barbeque	\$20.00

To Register: Mail your name(s), address and a check for the appropriate amount to:

**Succulent Symposium**  
**Huntington Botanical Gardens**  
**1151 Oxford Road**  
**San Marino, CA 91108**  
**(818)405-2160, FAX (818)405-0225**

Make checks payable to: The Huntington Botanical Gardens

Registration **DEADLINE**: September 6, 1993

We cannot guarantee meal/refreshments for late registrants. Friends' Hall-At the Huntington



## MEMORABLE MOMENTS by Frank Thrombley

- PAGE 23 -

The year was 1983. The place was at El Socorro, Baja. We had been stopping at the ocean's edge, at El Socorro, for lunch each time we went to the Central Desert in Baja. El Socorro is a coastal plain that is between 50 and 150 feet above sea level. There are two major washes across this plain, that end in the sea. We have been driving down one of these on each of our trips.

The elusive plant, *Mammillaria dawsonii* should be growing in this area, but I have been unsuccessful in my searches. It is possible it is illusory or it is an elusion, or is my mentality in question.

With us on this trip there is a person who has a college degree in Geology. He is also an excellent Horticulturalist. What a combination, one who knows the topography and the succulents. I cannot resist, this talent must be put to the test.

Joe Clements, after listening to my story, said that he would be happy to search for and bring back a *Mammillaria dawsonii*. With confidence he started to climb the slope to begin his search. I sat down to eat my sandwich and thought I can eat his sandwich also, for he will be gone for quite awhile. I finished my lunch and 'lo and behold' here comes Joe. Joseph handed me this wonderful plant with a slight dome-shaped head and tuberous root. It was truly a great find. (I am very glad I did not eat his sandwich).

Joe, the plant has doubled in size since that 1983 day. Further, it resides in the Baja Collection at the Wild Animal Park and is still one of my favorite plants in the collection. If we had been Indians in the old days, your name would surely have been "Hawk Eyes".

Thank you JOSEPH CLEMENTS for a memorable moment.

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*Editor's note: Socorro ( or Rancho El Socorro as it was know before the paved road) south of Ensenada and just above El Rosario is also the habitat of the diminutive and elusive *Mammillaria louisae*. In this xeric area bathed nightly in moisture laden fogs I have found stands of *Macherocereus gummosus* and *Bergerocactus emmoryi* with more crested growth than normal. Much of the area where these anomalies existed has now been plowed for agriculture. What a loss!*

*Joe Clements is curator of Desserts, ah no, Desert Gardens @ The Huntington Botanical Gardens, San Marino, California. He is also a director and active participant in the CSSA, as well as many organizations like the SDC&SS. Joe recently has taken up bungi jumping, accounting for his broken bone venture last winter. Woof!*

*And this, just in: There will be a feature article all about Joe Clements in the magazine Modern Maturity - should you get this magazine, please look for this article!*

---

If you enjoy our nice refreshment break - coffee and treats - please remember that is nice to contribute. You don't have to be on the list to bring something in, so please contribute to make us a better club!!

"If it were not for taking action and chances, success would be in the hands of very mediocre talent." Napoleon

## WISE AND OTHERWISE

by Michael Buckner



.....

"There is a carved stone monument from the 9th Century B.C., which is thought to show the fertilization of the date palm by shaking the male flowers over the tree. Although the process that went on was probably not at all understood, this was the earliest realization that within a species, some plants produce flowers of one kind and some give flowers of another kind. In scientifically modern times it was Rudolf Camerarius, working in the botanical garden at Tübingen, who found that in plants bearing two types of flowers, the formation of seeds in one type of flower depended on the simultaneous presence of the second type. The result was about the same whether he used corn (a monocot) or castor bean (a dicot). He observed that the second type of flower produced a "powder" that is essential for seed initiation, and thus recognized the essential nature of pollination and, correspondingly, that the style and ovary could be considered as female organs. Following his publication, *De Sexu Plantarum Epistola* (1694), numerous other examples of male and female flowers were brought to light. The independence of the two plant types was made clear by an experiment of Johann Gleditsch, Director of the Botanic Garden of Berlin Academy, who in 1794 fertilized a female palm growing alone in that garden with pollen from a male tree growing in Leipzig."

M.Kh.Chailakhyan & V.N.Khrianin Sexuality in Plants and Its Hormonal Regulation, Springer-Verlag N.Y. c.1987

.....

"As to what makes a species, Ernst Mayr puts it this way: "A species is a group of inter-breeding natural populations that are reproductively isolated from other such groups." That is the classic description of a biological species, or biospecies. Le Gros Clark goes on to say that a biospecies is "a genetic entity, genetically isolated from other species."

Both men stress isolation, for it is only in isolation - without the opportunity of exchanging genes that groups of animals or plants will gradually begin to develop behavioral and structured differences. The isolation can be physical: a desert or an ocean that effectively keeps apart two populations that once were one. It can be behavioral: a refusal on the part of the two creatures to mate, because they no longer recognize each other as suitable partners. Dogs, for example, do not mate with cats. Not only does it not occur to them to try, but because of the large genetic difference that have built up in them, it would be useless to. It is impossible today to produce, even by artificial insemination, a litter of puggles or kippies. Horses and donkeys, however, being more closely related than dogs and cats can still be mated to produce mules. But the mules are sterile, and the definition of the species holds up. Horse and donkey have become reproductively isolated; their mating cannot produce fertile offspring."



# WISE AND OTHERWISE

"The problem of sex in plants has been addressed since the times of Empedocles (circa 485-455 B.C.), Aristotle (384-322 B.C.), and Aristotle's student Theophrastus (370-322 B.C.). In their philosophical treatises, they were the first to note the presence of sex in plants, making a direct link between the flower and the fructification, and drawing an analogy between the reproduction of plants and the reproduction of animals. Camerarius (1694) discovered sexual differentiation in plants, Linnaeus (1729, 1753, 1767) created the concept of sexual organization in plant, and Kolreuter (1761) demonstrated empirically the existence of sex in plants through his classic experiments on true hybrids. The discovery of double fertilization in angiosperms by the Russian scientist Navashin (1898) was received with great interest by the scientific community."

M.Kh.Chailakhyan & V.N.Khrianin Sexuality in Plants and Its Hormonal Regulation, Springer-Verlag N.Y. c.1987

"Nature is careful of her old spare parts. We carry, at least in genetic potential, all we ever carried from the time we were devonian fish. Every man is part female, every woman part male, every mixture of the gene pool, a mixture for the better. Survival in a constantly evolving universe makes no petty minded distinctions between primitive and advanced."

\*\* taken from OCTOBER LIGHT by John Gardner

In the details of Linnaeus' (Carolus Linnaeus 1707-1778) argument we begin to see both the boldness of his emphasis on sexuality and why some contemporaries called him salacious. The twenty-three classes of flowering plants were distinguished on the basis of the "male" organs (i.e., the relative length and number of stamens). His twenty-fourth class (Cryptogamia), of the plants like mosses which appeared flowerless, were distinguished into orders on the basis of their "female" organs (the styles or stigmas). He made up their names from Greek words with plain sexual and generative overtones, drawing on such Greek words as andros (male), gamos (marriage), gyne (female). He described the class of Monandria as like "One husband in a marriage," the Diandria as "Two husbands in the same marriage. The poppy (Papaver) and the linden (Tilia), being Polyandria, he observed, showed "Twenty males or more in the same bed with the female." His Philosophia Botanica (1751) continued to insist on the calyx as a nuptial bed (thalamus) with the corolla acting as a decent curtain (aulaeum)....

We cannot be surprised that proper professors were troubled by such explicitness.... Even an accomplished botanist like the Reverend Samuel Goodenough (1743-1827), a vice-president of the Royal Linnaean Societies who had a plant, goodwinia, named after him, could not conceal his embarrassment at "the gross prurience of Linnaeus' mind....A literal translation of the first principles of Linnaean botany is enough to shock female modesty. It is possible that many virtuous students might not be able to make out the similitude of Clitoria." As late as 1820, even the iconoclastic Goethe was still hoping that young people and women could be shielded from Linnaeus' gross "dogma of sexuality."

From THE DISCOVERERS by Daniel Boorstin, c. 1983, Random House

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P.O. Box 33181  
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