

the BULLETIN A quarterly publication of the Arboretum Associates

Endangered Brazilian Species Flowers Beautifully 18 Years After It Arrives: The Blue Amaryllis, aka Empress of Brazil

This summer our specimen of The Blue Amaryllis or Empress of Brazil, scientific name: Worsleya procera (Duchartre) Traub, flowered for the first time after 18 years of nurturing. Don Craig, captured the lighting and rich beauty in the accompanying photo. Our beautiful specimen was grown and donated by Christopher and Vera Willmer (see accompanying article), originally from seed high in the mountains of Brazil where it grows on exposed, rugged, steep granitic cliffs. Christopher Willmer was a researcher at the UCSC Astronomy Department, while his wife Vera Diani, and daughter Asleif volunteered in the Arboretum. Currently,

Chris is Assistant Astronomer at Steward Observatory, University of Arizona, working on JWST, the successor to the Hubble Space Telescope. The Willmers would visit often and hope to see their prized plant flowering. Instead they would see a healthy plant growing bigger and bigger but without flowers. Finally, this summer it did flower to the applause and delight of everyone!

Our attempt to pollinate and develop seed was unsuccessful as out crossing is most likely necessary, i.e. another plant to mate with it is required to set fruit.

– Brett Hall



Native Plant "Week" April 10-24 ර Plant Sale April 16

Winter 2010-11 Vol.34, No.4

We're getting a jump-start on the official state California Native Plant Week by having a walk through the native garden and a talk on "Reimagining the California Lawn" in the days leading up to Native Plant Week. The simultaneous Arboretum and California Native Plant Society Sales on April 16, 2011 coincide with the formal start of the Week. Both the Arboretum and the CNPS will have a flowery mix of native plants for sale. Most of the natives are drought tolerant, but some of the CNPS offerings are canyon or riparian plants that can benefit from supplemental summer irrigation. In addition to natives, the Arboretum will have unusual exotics, including some new to our sales. The Arboretum's non-native plants are trialed and screened to see that they are noninvasive. Taken together the sales present a colorful display to spice up your garden for spring.

The week kicks off with a stroll through the front entrance native plant garden with Curator of California Native Plants, Rick Flores, Sunday April 10. Next, Carol Bornstein, who co-authored the book, "Reimagining the California Lawn" with Dave Fross and Bart O'Brien will do a presentation and book signing April 12th. The book is just about to be published by Cachuma Press. We are so close to the publication date that there is a slight possibility the book might not be available at the April 12th talk, but only in time for the April 16 plant sale.

It has been several years since we have had educational programs at the plant sale, but this year in honor of Native Plant Week, Director Brett Hall will give a talk about native plants at the sale. The talk will start right about the time we open the public sale at noon.

All of the talks about native plants this winter to late spring are part of the Arboretum's California Native Plant

from the director



First and foremost, thank you to all our volunteers, students and staff for keeping the Arboretum collections and programs alive and flourishing. Our guiding philosophy is to survive and thrive, come what may. This fiscal year, like so many other years, we are experiencing tremendous kindness and generosity from our friends even during these very difficult financial times. We thank you from the bottom of our hearts and promise to use your gifts wisely. Our goal to keep the Arboretum alive and well, while we raise the necessary revenue to pay staff and fund our operations will require spectacular success and we are up to the task. We especially appreciate the help we receive from everyone! Beyond this, a little extra good luck certainly won't hurt!

Brett Hall

California Native Plant Week

As mentioned elsewhere in this Bulletin, the California State Assembly and Senate approved Resolution ACR 173 (Evans) establishing California Native Plant Week. It was co-sponsored locally by Assemblyman Bill Monning. This measure proclaims the 3rd week of April, each year, as California Native Plant Week and encourages community groups, schools, and citizens to undertake appropriate activities to promote the conservation, restoration, and appreciation of California's native plants. The Arboretum will be joining the CNPS to celebrate native plant week.

There are some people out there living native plant week year round who don't need to prepare for a native plant week. By sponsoring events and sales we do hope to generate much broader interest and support for native plant conservation. While the Arboretum continues to value and support its rich worldly collections we are increasing our efforts to foster the native plant program every chance we get. We recently finished a grant from the Elvenia Slosson Research fund to build our central coast native collections and we are now embarking on a more formal native plant introduction program under the capable leadership of Nursery Manager, Helen Englesberg and her energetic volunteers and students. Linda Willis is the key volunteer working with Helen and others on this effort. Linda is an extremely successful and knowledgeable native plant propagator with a keen eye for natives that fit various garden niches.

Celebrating Rare Manzanitas

On a beautiful sunny day in late January, Chancellor George Blumenthal joined

a small crew of dedicated manzanita

(Arctostaphylos) scholars, students and staff

to plant two extraordinarily rare species in

the Arboretum Entrance Native Garden.

With careful direction from our California Curator, Rick Flores, Chancellor Blumenthal

wheeled a shovel to plant Arctostaphylos

franciscana (San Francisco manzanita)

and A. ohloneana (Ohlone manzanita).

Mike Vasey, Arboretum Associates Board

member, and co-author of Arctostaphylos

in the upcoming 2nd Edition of the Jepson



Arctostaphylos franciscana planting

Manual, was here to help and described the intriguing biogeography and natural history of the rare manzanitas while answering questions from the San Jose Mercury and Santa Cruz Sentinel. *Arctostaphylos franciscana* was considered extinct in the wild for some sixty odd years until one plant was rediscovered on the edge of San Francisco last year. The sole individual was found in the middle of a construction project and after extensive study and collaboration, cuttings were distributed to many public gardens and expert growers, including the UCSC Arboretum, before the wild plant was successfully transplanted to another location on the Presidio. The other rare manzanita that Chancellor Blumenthal planted, *Arctostaphylos ohloneana* is restricted to a few ridge tops on the upper Scott Creek drainage where it grows with yet another very narrowly restricted endemic manzanita, *Arctostaphylos glutinosa*. In addition to these celebratory plantings we are continuing development of a five acre conservation garden for central coast maritime chaparral in the California Native Gardens in the back forty of the Arboretum where several dozen manzanita species are being planted along with many of their naturally occurring associates.

The Bulletin of the UCSC Arboretum Associates Volume 34, No.4 Winter 2010-2011 Published April 2011

Editors: Stephen McCabe and Brett Hall

The Bulletin is published quarterly by the UCSC Arboretum Associates, a non-profit organization that provides support for the Arboretum at UCSC.

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Gifts for Labels

Among the many recent gifts to the Arboretum, three very special women who are also very talented Arboretum volunteers have collaborated on gifts totaling \$11,500 for plant labels. Simultaneously we were recently delighted to welcome a new volunteer, Tony Morosco, who was formerly Collections Manager with the San Francisco Botanical Garden. Tony developed the label making process currently in use with a computer driven laser engraver in the San Francisco Botanic Garden. Tony came just at the right moment and is volunteering to help us set up our process in the Arboretum now. We have decided to hold off on purchasing a laser engraver until further funds can be raised. Instead we will contract out for the label making part while we utilize Tony's expertise formulating our internal process. If you are interested in learning more about our label project or contributing towards it, please do contact us.

Ray Collett's Rare Violets

Founding Director, Ray Collett, has been burning the midnight oil trying to raise awareness about new discoveries of beautiful, fragrant and woody Viola entities in the Santa Cruz Mountains. At least one of these occurred naturally on the UCSC Arboretum and we have recently replanted this beautiful pink violet around the Dean McHenry Amphitheatre plaque adjacent to the amphitheatre. Several other forms Ray has brought to our attention are being raised for planting out soon, as well. You can see Ray's beautiful pictures and descriptions of Santa Cruz Mountain Viola species in the Cal Photos website. Simply go to a search engine on your browser and type Cal Photos Ray Collett Viola and let the fun begin! There is a brave new world awaiting us all.

Ray Collett has made generous donations to the Arboretum over the years, including his establishment of the Arboretum Plant Acquisition & Travel Fund/Endowment. He has just made an additional donation to the Arboretum.



Violets



Darwinia leiostyla

Darwinia Heaven in the Australian Rock Garden

If you have not had the opportunity to visit the stunning display of *Darwinia leiostyla* that Melinda Kralj has created in the Australian Rock garden, then hurry!! You won't want to miss it. *Darwinia leiostyla* is a narrow endemic known only from the Stirling Ranges of Western Australia. And while you are here, spend a couple hours wandering around enjoying the results of evolution and natural selection from across the world!

– Brett Hall

news & notes

Bring your Membership Card

One of the ideas we suggested to our great January volunteer class was to staff the entrance with greeters on some of our busier days. They took this suggestion with enthusiasm. The greeters collect admission fees and help orient visitors to the Arboretum. Having greeters staff the entrance, helps generate more in admissions revenue than the self-serve system does. Thank you Julia Cowell, Vicki Garside, and Nancy Drinkard for heading up this effort. As always, members, UCSC students, and those only shopping at Norrie's get in free. Visitors have been understanding of the admission fee, which is a way casual visitors now help members in support of the Arboretum. Let the office know if you need a replacement membership card to expedite your entrance to the Arboretum, (831) 427-2998, arboretum@ucsc.edu.

Hummingbird Days a Smashing Success:

Thanks to a wonderful article by UCSC Science Writing student, Donna Hesterman, we had hundreds of people on the Saturday (perhaps 750-1100 people) as well as extra visitors every day from the Friday before to several days after the event. Larry Selman's program on photographing birds was well attended and well appreciated both days. Volunteers from the Sorority Alpha Kappa Delta Phi staffed the children's crafts tables each day and many other volunteers kept visitors humming along. Australian grevilleas, South African heathers, aloes, native currents and manzanitas were some of the plant superstars who brought in the hummingbirds. If you missed the days, the hummingbirds are still around, and in the brochure holder by the Horticulture 2 welcome sign, we still have lists of plants that attract hummingbirds.

Volunteers Log Over 10,000 Hours in 2010!

Lynda Haworth reports there were over 10,882 hours put in by volunteers in 2010. That is the equivalent of more than FIVE extra employees! In addition to the thanks in Brett's column, we want to thank all of our volunteers who have done everything from weeding to office work. You made the upkeep of the Arboretum and our events so successful. We couldn't do the plant sales, dried flower and succulent sale, and the holiday open house without you. We appreciate our new 2011 volunteers as well. (Don't forget to report your hours to Lynda H.) And thank you to everyone who staffs and shops at our Norrie's Gift Shop. — *Stephen McCabe*

5th Plant Research Symposium Promotes Sharing of Research Results

UCSC Plant Science grad students and faculty came to the Arboretum to share their research proposals and results at the Arboretum in February at the 5th Biennial UC Santa Cruz Plant Research Symposium sponsored by the Jean Langenheim Chair in Ecology and Evolution and the Arboretum. Professor Erica Zavaleta and I welcomed the researchers and students to the Arboretum for a series of 19 talks and several poster sessions. Arboretum research plants made up almost all of the research plants used in a poster by Jenn Yost, Megan Bontrager, myself, Kathleen Kay (Assisstant professor at UCSC) and Matt Ritter (Associate professor at Cal Poly San Luis Obispo. Megan, an undergraduate, did the honors of presenting and defending the poster. Arboretum Board Member, and UCSC PhD. Candidate, Michael Vasey presented, "Why coastal manzanitas love to party: It's the fog!" which was widely believed to have the most humorous title for a talk at this academic affair. Vasey is also one of the recipients of the Jean Langenheim fellowships in Plant Ecology and Evolution. Bontrager and Yost are in the Kay lab and Vasey is in professor Karen Holl's lab.

Yost also shared the collaborative genetics work by presenting the Dudleya poster at Northern California Botanists Symposium in January, titled "A classification of California's diploid Dudleya species based on molecular phylogenetic data," by Yost, Bontrager, McCabe, Kay and Ritter. – Stephen McCabe

Frans Lanting Photography Classes Help Raise Funds for Arboretum

Thursday April 21 - Sunday April 24, 2011. Frans Lanting Photo Workshop. 10% of the fees paid by Arboretum members and those who hear about it on this website will go to support the Arboretum.

"The Art of Seeing" Finding Your Point of View in Nature Photography. \$1650. To sign up or ask questions, please contact Jessica Staley directly at 831-429-1331 or info@lanting.com.

Endowments for the Future

Many of the Arboreta that are successful over the long run have at least part of their support from endowments or funds that act like endowments. In these funds a portion of the interest each year is used to support the unit and the principle investment in untouched or virtually so. The Harry O. Warren Endowment supports the New Zealand Garden and South Pacific collections. The Farwig (FFE) Endowment from the estates of Stan Farwig and Vic Girard supports growing of bulbs like the Blue Amaryllis and mariposa lilies. If you are looking for ideas, here are a few.

- Add to the general endowment in support of the Arboretum. This gives us the flexibility to use it for salaries, supplies or equipment, depending on what is needed most. Any amount from \$25 and up will help.
- Start an endowment or named endowment to eventually fund a part time employee to care for the succulent collection. Our target is \$500,000 within the next 4-10 years.
- Name a path. Paths may be named in honor of or in memory of someone for endowments between \$100,000 and \$200,000 (or more). Regents approval may be needed.
- Sponsor an education/library assistant at 15 hours per week, entry level. This person could train student volunteers to lead children's tours, help with events, maintain signs and labels, and help the volunteers in the library. An endowment of \$260,000 should provide enough income to support this assistant.

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Ribes, a native curran

The UCSC Arboretum Worsleya procera Blossoms

Worsleya procera is a bulb, native to the Serra dos Orgaos, and is found in the county of Petropolis, State of Rio de Janeiro, Brazil. This mountain Worsleya procera is a bulb, native to the Serra dos Orgaos, and is found in the county of Petropolis, State of Rio de Janeiro, Brazil. This mountain range is one of several subdivisions of the Serra do Mar, which extends along the Brazilian coast from about 27 degrees S to 5 degrees S. It is covered by the Mata Atlantica (Atlantic Rain Forest), which ranges from sea level to elevations of 2700 m and higher. A component of the Mata Atlantica are the inselbergs, dome-shaped rocky outcrops of pre-cambrian gneiss or granite (Porembski et al. 1998), which harbor a large diversity of plants, with a very high frequency of endemism (e.g., Brade 1956; Martinelli & Bragan_ca 1989). In Brazil, the vegetation of these inselbergs is known as "Campo Rupestre" (Rocky Savanna), where it reaches 1600m and higher, as "Campo de Altitude" (High Elevation Field). The Serra dos Orgaos has many of these outcrops and on some of these (Figure 1), Worsleya procera is found.



Figure 1: Panorama of the Serra dos Orgaos taken from Morro do Carneiro, just North of the road linking Petropolis to Teresopolis. The view is roughly to the SW. The letters identify Maria Comprida (MC),Monte de Milho (MM), Joao Grande (JG) and Retiro (R). Morro do Cuca (C) is in the direction of the Arrow, but is hidden by the hills neighboring Maria Comprida.

Synonyms for Worsleya procera (Resslar 2007) are W. Rayneri and Hippeastrum procerum. In Brazil it is known as Rabo de Galo (rooster's tail) because of the shape of its leaves; in English-speaking countries it is called as the blue amaryllis or the empress of Brazil. Worsleya procera is a rare, endemic species listed as critically endangered on the IBAMA List (Moraes 2009), by the Brazilian Environmental Agency. It is known from 21 locations in the Serra das Araras (Macaw Mountains), known in Petropolis as Serra das Antas (Tapir Mountains), of which the most prominent peak is Maria Comprida (Long Mary). This is where Rabo de Galo was first collected in 1863 by the Jean Baptiste Binot. Almost all known locations are vulnerable to hazards such as fire, invasive species and even land speculation (Moraes 2009).

In both of the locations where I have seen this species, Pedra do Retiro (Fig. 2) and Monte

de Milho (Fig. 3), it grows on the North (sunfacing) slopes on small granitic ledges. The leaves are curved and generally oriented towards the sun.

These plants reach 1.5 m and higher (Fig. 4). Several of the locations are often enshrouded in fog due to orographic condensation, particularly during the southern winter. The southern summer is the wet season, and this region is subject to thunderstorms and occasional intense rainfall. The way Rabo de Galo clumps in the wild suggests reproduction from seeds and off sets. Interestingly, there are a few specimens of *W. procera* in gardens on the lower slopes of Pedra do Retiro, at some distance from the known documented populations. These specimens may be from natural dispersal.

The UCSC Arboretum Plant

A friend collected a few *W. procera* seeds sometime in 1992 at Monte de Milho, and sent them to me while we were living in Santa Cruz as a memento of Petropolis. A total of 5 seeds were sown around November 1992 with common potting mixture, which was placed in an unheated south-facing room next to seeds

> of the African *Veltheimia bracteata* in the house that we lived in just below the UCSC Campus in Santa Cruz.

Both sets of seeds were treated similarly and by December 1992 the single *W. procera* had already sprouted. When moving back to Brazil in September 1993, we found

foster parents for our Rabo de Galo in the UCSC Arboretum. Since August 1993 the Arboretum has been its home. When we lived in Santa Cruz from 1998-2005 we would often come by and visit the plant. While my wife, Vera, was working as a volunteer at the UCSC Arboretum she repotted the plant once more (in 1999). Skimming through the web



Figure 2: Group of plants growing on the Pedra do Retiro.



Figure 3: Worsleya on Mnote de Milho

it became clear that W. procera does take on the order of 15 years to bloom from seed, so our UCSC Arboretum plant is not unusual in this respect. Resslar (2007) states that there are different strains of *W. procera* and it would be interesting to verify if these correlate to the geographical origin of these plants and how the UCSC plant compares with the different varieties grown by Resslar in Virginia.

We thank our friend EGY for sending the seeds and the UCSC Arboretum for adopting the specimen of *W. procera* and fostering it into maturity. Special thanks go to the volunteers who have been caring for this plant and, in particular, Maria Smith and Astrid Randall.

Both kept us updated on its progress. - Chris Willmers

For the original essay and all the pictures, please go to the Arboretum website.



Figure 4: Vera Diani with a Worsleya on Monte de Milho. This plant was over 1.5 m tall.

calendar of events Winter2011

april

GARDEN TOUR

Saturday, April 2

1st Saturday of every month. Tour of the Arboretum, free with admission. Meet at Norrie's at 11:00 am.

COMMUNITY DAY

Tuesday, April 5

1st Tuesday of every month. Free admission to the Arboretum.

NATIVE PLANT WEEK

April 10-24

During the official week Apr. 16-24, plant out your purchases from our plant sale and take strolls on your own through the Arboretum natives or through state park wildflower meadows.

NATIVE PLANT WEEK

Sunday, April 10, 11 am

California Native Plants for the Garden. Rick Flores, Curator of the California Native Plant Collections. Free with regular admission and to members.

CALIFORNIA NATIVE PLANT CON-SERVATION AND HORTICULTURE LECTURE SERIES.

Tuesday, April 12

Reimagining the California Lawn. Booksigning and talk by Carol Bornstein. 6 pm potluck, 7 pm talk. Free.

SPRING SALE

Saturday, April 16

10-12 members of either organization, 12-4 public. CNPS and Arboretum. See website for plant list.

CALIFORNIA NATIVE PLANT CON-SERVATION AND HORTICULTURE LECTURE SERIES.

Saturday, April 16 at the Plant Sale, Noon

"Native plants for the Garden." Brett Hall, Arboretum Director. Hands-on lecture with live plants as props.

may

COMMUNITY DAY

Tuesday, May 3

1st Tuesday of every month. Free admission to the Arboretum.

GARDEN TOUR

Saturday, May 7

1st Saturday of every month. Tour of the Arboretum, free with admission. Meet at Norrie's at 11:00 am.

CALIFORNIA NATIVE PLANT CON-SERVATION AND HORTICULTURE LECTURE SERIES.

Monday, May 9. 7:30 pm (no potluck!)

"A Californian's Guide to Trees Among Us." With Cal Poly Associate Professor, Matt Ritter. Talk and book signing. Jointly sponsored by the Arboretum and CNPS. Free.

Tuesday, May 17. 6 pm potluck, 7 pm talk.

Brett Hall, director. "UCSC Arboretum Native Plant Program: Highlights from the Central Coast." He will discuss the Arboretum Native Plant Program and illustrate current field work and collections from the central coast, our native plant introduction program, and the purposes of our conservation and display gardens. Free.



Isopogon formosus

FLOWERS AND MUSIC OF THE WORLD: MUSIC IN THE GARDENS *May 29, Sunday, 1-5 pm at the Arboretum*

There will be at least five musical acts from different musical genres, tours from one venue in the garden to the next, wine and food. Co-sponsored by the Baroque Festival. Admission to the Arboretum all day this day is \$40 for the public and \$30 for Arboretum Members and Baroque Festival Subscribers. \$20 (youth = 18 and under). Tickets available at the UCSC Box Office and the Civic Center Box Office. We may have the Arboretum-to-farm gate locked that day.

Flowers and Music of the World sponsors and providers of food and beverages:

Bavarian Pretzelworks, el Salchichero community butcher (meat based appetizers), Pele's Oven (gluten-free), India Joze, Little Sky Lavender (iced tea and tisane), Kitchen Sink (endive cups), Tabitha's Appropriate Jams, Companion Bakers. Santa Cruz Mountain Brewing (organic, locally brewed beer), Burrell School Vineyards and Winery, Loma Prieta Winery, Poetic Cellars Winery, MJA Vineyards, Villa del Monte Winery, Santa Cruz Mountain Vineyard, Guglielmo Winery, Aver Family Vineyards, House Family Winery, Debbie Douglas Designs (glassware)

june

GARDEN TOUR

Saturday, June 4

1st Saturday of every month. Tour of the Arboretum, free with admission. Meet at Norrie's at 11:00 am.

COMMUNITY DAY

Tuesday, June 7 1st Tuesday of every month. Free admission to the Arboretum.

Plant Sale... (cont'd - p. 1)

Conservation and Horticulture Lecture Series. The series name has been changed from its former designation Central California Coast Native Plant Conservation and Horticulture Lecture Series. We thank the Santa Cruz County Water Conservation Coalition for helping promote some of the events, including the "Lawn" talk. Information about water conservation ideas can be found at their website. www.WaterSavingTips.org

– Stephen McCabe

Pruning tips, briefly

news or notes cont'd_ - p.4

After flowering is generally a good time to prune many drought tolerant shrubs, especially if that time does not correspond to a long, damp stretch of weather. A few plants that respond well to pruning are Leucadendron 'Safari Sunset', Grevillea 'Mason's Hybrid', and groundcover manzanitas. Telopeas can be pruned back hard to regenerate growth. Protea 'Pink Ice' and the king protea can stand a medium amount of pruning. Some that don't respond as well to hard pruning, according to Curator Rick Flores, are some of the young, shrubby manzanitas. The same is true for many of the proteas and leucsospermums. Rather than a hard pruning, it is probably best to just prune Leucadendron argenteum lightly to shape and to keep it open enough to reduce the risk of fungus problems. You may tip prune the purple hibiscus Alyogyne often and any time to keep it from getting leggy, though some people avoid pruning during the time of the year when some frost is possible.



Protea

THE ARBORETUM IS STRONGLY ROOTED Support the educational, horticultural, conservation and research goals of the Arboretum!

Yes, I want to give a donation, a gift membership, or renew my Arboretum Associates Membership!

| New Member Renewal Gift Membership* Donation Only (no benefits) | | |
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| Cash | | \$45 Calif. Poppy |
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| Card No | Exp. Date | \$ \$100-\$249 |
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The Arboretum at UC Santa Cruz is a living museum inspiring stewardship of the world's biodiversity through research, education, and the conservation of rare, endangered, and extraordinary plants.

Printed with soy inks on recycled paper

nursery discount program

Arboretum Associates can enjoy 10% discounts on plants (and sometimes on related merchandise) at the following nurseries:

Gold Rush Nursery 3625 N. Main Street, Soquel, CA 95073 • (831) 465-0314

Drought Resistant Nursery 850 Park Ave., Monterey, CA 93940 • (831) 375-2120

Garden Company 2218 Mission St., Santa Cruz, CA 95060 • (831) 429-8424

Golden Nursery 1122 Second St., San Mateo, CA 94401 • (650) 348-5525

Hidden Gardens Nursery 7765 Soquel Dr., Aptos, CA 95003 • (831) 688-7011

Ladera Garden Center 380 Alpine Rd., Menlo Park, CA 94028 • (650) 854-3850

NewGarden 2440 Mattison Ln., Santa Cruz, CA 95062 • (831) 462-1610

Pottery Planet 2600 Soquel Ave., Santa Cruz, CA 95062 • (831) 465-9216

ProBuild Garden Center 235 River St., Santa Cruz, CA 95060 • (831) 423-0223

Sierra Azul Nursery 2660 East Lake Ave., Watsonville, CA 95076 • (831) 763-0939 And, of course,

Norrie's Gift Shop at the Arboretum.

Moving? Please let us know the address of your next garden... Thanks

The Arboretum is open daily from 9AM-5PM. Norrie's Gift Shop is open daily 10AM-4PM The Jean & Bill Lane Library is open Wed-Sun 12PM-3PM. Visit the Arboretum's website at: **arboretum.ucsc.edu** For information, or if you have any disability-related needs, call (831) 427-2998 or fax us at (831) 427-1524. 87 **Arboretum** University of California Santa Cruz 1156 High St. Santa Cruz, CA 95064

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