

The Bulb Garden



~Gardening with Bulbs ~

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Bulbs of the UC Botanical Garden's California Collection

Ben Anderson

Ben Anderson has a degree in Environmental Horticulture from the University of California, Davis. After spending several years in the nursery industry in Southern California, Ben went on to work at the San Diego Botanic Garden (formerly Quail Botanic Garden). He has spent the last four years as the horticulturist for the California native plant collection at the University of California Botanical Garden in Berkeley.

This article is drawn from my experience as a horticulturist working with the California native plant collection at the University of California Botanical Garden (UCBG) in Berkeley. I have had

the pleasure of inheriting stewardship of a wonderful collection of plants, and my particular interest in geophytes has grown with time. I start with site conditions and cultural information, including information on soils, irrigation, and

pests, and then I describe notable bulbs within the collection.

UCBG sits on approximately 34 acres of hilly terrain, crossed by creeks, in the East Bay hills of the San Francisco Bay area. The climate is Mediterranean, with occasional temperatures in the 20s F (a few degrees below freezing) in winter, and an average of 26 inches (650 mm) of rain falling approximately between mid-October and May. The native soil is slightly acidic clay,



Pacific Coast Iris and Ceanothus growing in the California collection at the UCBG. Photo by Paul Licht. Many thanks to Paul for his help with photos for this article!

and the site is surrounded by dense woodland dominated by oaks (*Quercus* spp.), California bay (*Umbellularia californica*), and madrone (*Arbutus menziesii*). The state

of California has tremendous variation in topography, geology, and precipitation. Add its relatively recent (in geologic time) and increasingly arid Mediterranean climate, and you have a play-
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Ledebouria scabrida: A Namibian Endemic?

Cody Coyotee Howard

Cody Howard received a BS from the University of Arkansas where he studied Horticulture. Upon completion of this degree, he migrated to southern California where he accepted a position at the Huntington Botanical Gardens. While there, he became interested in *Ledebouria* and through the support of the Huntington and various others, he has made several trips to Namibia in order to begin studying this enigmatic genus. Currently, he is in a PhD program at the University of Florida where he will be for the remainder of his twenties and early thirties diligently working on untangling the complexities of this group.

The genus *Ledebouria* (Hyacinthaceae) is a group of roughly fifty-four species that occur in sub-Saharan Africa, Madagascar, and SW Asia, with the currently identified center of diversity being the Limpopo, Mpumalanga, and KwaZulu-Natal provinces of the Republic of South Africa. They are mostly summer-growing, deciduous, bulbous plants—bulbs either hypogean (below ground) or epigeal (above ground)—with leaves from 3 to 30 centimeters (about 1 inch to 12 inches) in length and often with decorative maculation.

The inflorescence can be erect or decumbent, and individual flowers are small and generally not very showy. However, closer examination can reveal beautiful

flowers, with some having bright purple filaments complemented by yellow anthers.

The genus *Ledebouria* has a complicated taxonomic past. Differences in leaf maculation and growth habit of *Ledebouria* have resulted in the publication of 102 species in four different genera, leading to many name changes throughout the taxonomic history of the genus, in addition to nomenclatural and taxonomic confusion. The type species, *Ledebouria hyacinthina*, was described from India in 1821 and

was later transferred to *Scilla* by Baker in 1870. In his monograph on *Scilla*, Baker wrote the first revision on section *Ledebouria* and also on the genus *Drimiopsis*. *Ledebouria* remained a subgenus of *Scilla* for 100 years until Jessop reinstated it for plants from South Africa. The work of various researchers has resulted in a conflict of agreement as to where *Ledebouria* stands taxonomically. Some believe *Ledebouria* should be a larger genus that includes both *Drimiopsis* and *Resnova*, two closely related genera. Leaf characteristics of

these three genera tend to be quite similar, which can make it fairly difficult to distinguish between them. The flowers of the three genera are a different story, but still, some researchers argue these characteristics are not stable enough for use in delimiting species. Additional samples combined with molecular (DNA) analyses will help to determine relationships among the genera.

At this point in time, it is too early to make a definite decision.

The scientific literature on *Ledebouria* in Namibia is almost nonexistent with only one known publication on the genus.

Ledebouria scabrida (Figure 1) is the first species of this group described from Namibia. Various books on the flora of the Okavango Delta or the Kalahari Sand Dunes mention the genus but, typically, plants are not labeled at the specific level or potentially misidentified. The distribution maps published by

Stephanus Venter (Venter, 1993), who revised the species of South Africa, do not extend into Namibia, but he does mention that a few species, such as *L. undulata*, may extend into the country. Prior to my work in Namibia, the National Herbarium of Namibia had only five species cataloged in their collection: *L. revoluta*, supposedly a very widespread species found from the tip of Africa all the way to Sri Lanka; *L. undulata*, a species found sporadically in South Africa, including

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Figure 1, top: A fruiting specimen of *Ledebouria scabrida* found at the first encounter near Otjinene. Figure 2, bottom: Typical calcareous soil that *L. scabrida* populations can be found inhabiting. This population was right next to the road.

Ledebouria scabrada: A Namibian Endemic? (cont'd)

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the winter-rainfall regions; *L. cooperi*, again, another widespread species that can display large variations between populations; *L. luteola*, a confusing species to me; and *L. floribunda*, a large and easily identifiable plant. In addition to the labeled specimens, there were also twenty-one unidentified sheets, which will require many hours of study in order to determine the species.

To date, in collaboration with the National Botanical Research Institute of Namibia, there have been three successful collecting trips to document *Ledebouria* in Namibia. Strong research collaborations have been established with staff at the National Herbarium of Namibia (WIND) and the National Botanical Gardens of Namibia, including Silke Rügheimer, curator of the National Botanical Gardens; Esmeralda Klaassen, curator of the National Herbarium; and Leevi Nanyani, research technician for the Herbarium. In total, 134 specimens have been collected, including nineteen herbarium specimens, and the remainder consisting of living specimens. Tentatively, twelve different species have been collected and, given the extent of unexplored territory, it is anticipated that more will be found.

Now, back to *Ledebouria scabrada*, which is not found in the National Herbarium. It is one of the most recognizable species from the country due to the bumps on the surface

of the leaf (hence the name: *L. scabrada*). It was first described by Jessop in 1971 from a specimen found and collected by Mr. H.R. Tölken in 1970. Interestingly, after the publication of the species, it was never heard of again, most likely due to the lack of interest and knowledge of the bulb. During November 2012, one of the discoveries of the trip included a large, healthy population of *L. scabrada*. This population was near Otjinene in the north-eastern part of the country, located 69 kilometers (43 miles) from the type locality at Epukiro. I took photographs to document the local leaf variation found in the

population (and because I was really excited), and I made living and herbarium collections (Figures 3-5). The population was found growing in calcareous soil, which is the same type described by Jessop (Figure 2).

After this excursion, colleagues in Namibia began sending me photos of *L. scabrada* taken at various locations around the country. The sites were quite a distance from the type locality, which made me doubt the endemic status of this species. With improved collections we can begin to piece together the distribution of this species and determine whether or not it truly only occurs within the political boundaries of Namibia. In order to determine the status of this species neighboring countries will have to be explored in areas that will likely harbor this species.

Thanks to the Mary Sue Ittner Bulb Research Grant sponsored by the Pacific Bulb Society, research on this enigmatic genus will continue in Namibia. The potential for increasing our understanding of this group in Namibia is large since the only published research on the genus occurred some forty years ago. Many thanks also go to the Huntington Botanical Gardens for supporting this work and my passion for this small, sometimes under-appreciated genus. Funds received from the Cactus & Succulent Society of America Research Grant have also supported this work since its conception; I am indebted to their belief in the work. The future holds many exciting discoveries, so keep your eyes open for updates.

*Editor's Note: At the completion of this article, a trip to Namibia occurred where further populations of *L. scabrada* were located. A future article will detail these findings.*

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Literature Cited

Venter, Stephanus. 1993. A revision of the genus *Ledebouria* Roth (Hyacinthaceae) in South Africa. Unpublished M.Sc. thesis, University of Natal, Pietermaritzburg.



Clockwise from top: Figure 3 - The excitement overwhelmed me and I had to get a picture with a group of *L. scabrada*. Figure 4 - The first herbarium specimen of *L. scabrada* made during the November 2012 trip. Figure 5 - A collection of specimens displaying typical variation of leaf spots that can be found within a small population.



Bulbs of the UC Botanical Garden's California Collection (cont'd)

(continued from page one)
ground for speciation, as well as a wealth of refugial habitats for relict species. The state is rich with geophytic taxa that inhabit places ranging from salt-sprayed coastal bluffs, to snowy alpine areas, to subtropical desert. The California collection at UCBG aims to display a cross-section of this diver-



sity. Material is almost entirely wild-collected, with name and brief provenance data displayed on signs. Wild provenance is essential to the collection because it serves as both research and public education.

The approximately 14-acre native plant collection is broken up into beds that represent categories such as vegetation type (e.g., blue oak savanna, redwood grove), geographic area (e.g., desert, north coast, Berkeley hills), geology (e.g., serpentine), and specialty zones including pygmy forest, vernal pool, alpine fellfield, and riparian. Geophytes play a prominent role throughout the collection and are incorporated into these areas as appropriate. For example, you'll find a wealth of *Brodiaea* and other themids (Brodiaeoideae; previously Them-

idaceae) in many of the areas, especially grassland and woodland periphery. Seep areas contain such species as *Lilium pardalinum*, *Toxicoscordion* spp., *Hastingsia* spp., and *Triteleia peduncularis*. *Scoliopus bigelovii* and *Trillium* spp. form large colonies under oak cover, and you'll find *Allium* spp. in some exposed rocky areas and

lows dozens of different bulb taxa to be viewed and compared side by side. The bulbs are placed in ceramic pots sunk just below the surface of the gravel and labeled. The bulb beds are a great way to brush up on our keying skills and get a feel for the morphological differences between various taxa. In many cases, a single species, for example *Triteleia laxa*, will be represented by collected material from different parts of its range, and variable traits such as flowering time, color, and leaf morphology are easily compared.

The bulb beds take some maintenance. Removing developing seed capsules is essential to avoid a mass of seedlings germinating in the closely spaced pots.

Left: a vernal pool in the California collection. Below: *Trillium chloropetalum* thrives at the UCBG. Both photos by Paul Licht.



open places.

Bulbs are also featured in another way: the "bulb beds." These are essentially raised stonework troughs, lined with wire mesh and filled entirely with gravel. This provides excellent protection against plant-eating pests and al-

Every year, during the dry season while most of the bulbs are dormant, approximately one-third of the pots are pulled. The bulbs are removed, the planting mix is discarded, and the bulbs are replanted in fresh mix. This is done
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Bulbs of the UC Botanical Garden's California Collection (cont'd)

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to alleviate crowding and reinvigorate the soil. I am still experimenting with mixes, but in general I keep the mix fast-draining, especially for things like *Calochortus*, *Allium*, and the themids. I use a combination of soil and lava rock, sand, pumice, or Turface, depending on the species I am working with. I find perlite difficult to work with, due to the settling and the dustiness during repotting. I incorporate some fertilizer in the mix and occasionally fertilize during the growing season. Over time, roots from nearby oaks and manzanita (*Arctostaphylos* spp.) have found their way into the gravel of the bulb beds. These roots can actually enter the pots through the drainage holes and coil around and out-compete the bulbs for moisture; I yank these roots out as I run into them.

Irrigation of the bulb beds is done by hand. *Chlorogalum*, *Calochortus*, *Allium*, and themids receive some supplemental irrigation during extended rain-free periods from mid-October to May. *Lilium*, *Camassia*, and *Hastingsia* receive irrigation into summer.

Irrigation of the main 14-acre in-ground California collection is a different story. The bulk of the irrigation is by underground galvanized pipe, with hose bibs and manually controlled, adjustable rotor sprinklers on risers. I have spent, and continue to spend, a lot of time consolidating plants based on watering needs and modifying and adding to the existing irrigation system. Determining watering needs for such a diverse assemblage of plants from different areas of the state has

been a continual learning experience, and geophytes add another level of complexity. I look at what the plants would get in their native habitats and do my best to mimic those conditions. Our database can tell me where each accession was collected, and sometimes what associated species were at the collection site. I find other resources, including the *Jepson Manual*, the *Manual of California Vegetation*, and *calflora.org* useful in determining how to place bulbs within the collection and how to water appropriately. The bulk of the collection is made up of winter-wet, summer-dry plants; for these, I try to make every year a wet year, while still honoring the summer/fall dormancy period, which is particularly important for many of the bulbs. But within the collection are also many new plantings, which need help getting established during the dry season, as well as seep plants, riparian plants, plants that get ocean spray, and so

on. I find myself hand-watering and building specialized irrigation systems to deal with specialized needs. I have constructed several systems of buried poly tubing and emitters that run on automatic timers in seep areas and in the vernal pool, where plants tend to have an extended wet season and/or like to have their feet wet for part of the year. These have worked well, and I plan to build more seep-type areas and create a wet meadow habitat.

Rodents are a major threat to bulbs in the collection. There are healthy populations of gophers, voles, and squirrels that are drawn as if magnetized to many of the bulbs. *Brodiaea* and other themids seem to be targeted in particular. I use a variety of tactics to combat herbivory: traps, deterrents, and cages and/or pots. Any bulb that I suspect is vulnerable to herbivory gets planted in a wire cage or pot. In addition, I generally sprinkle granular deterrent over new plantings to deter squirrels, which sometimes dig up newly planted bulbs. It's possible that raccoons and/or skunks are also digging, but I have only

observed squirrels in the act. Once the soil has settled, digging seems to be less common, so I generally don't apply deterrent more than once. During my day-to-day routine, I always keep an eye out for the characteristic fan of soil that signals gopher activity. Sometimes I find that gophers have tunneled all around a cage or a pot in the ground. I set a trap or two in the tunnels, and when I succeed in trapping something, a larger predator usually steals it for a meal during the night. I often

come back the next morning to a crater, a mess of dug-up soil, and an empty (but tripped!) trap. I find it useful to secure the trap to a stake lest the predator take both gopher and trap elsewhere to dine. A fellow horticulturist has found piles of gopher traps in certain locations in the garden.

Some of the bulbs in the collection really stand out above the rest. My criteria for choosing the following notable bulbs are resilience and proliferation over time. These are bulbs that I would not call "fussy"; rather, they have done remarkably well for many years under successive horticulturists' care and the corresponding variations on watering, fertilizing, and rodent and weed control—or lack thereof. (Hey, we're all human.) All of the following have been grown for years, in-ground, outdoors at

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Allium falcifolium is well established at UCBG. Photo by Nhu Nguyen.

Bulbs of the UC Botanical Garden's California Collection (cont'd)

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UCBG. These are what I call garden-worthy experiments.

A number of different collections of *Lilium pardalinum* from across its range have been planted throughout the collection. It seems that in areas where they received off-season water (beyond our winter rainy season), they have fared much better, and proliferated clonally, than in drier areas. As far as I have seen, all *Lilium* were initially planted in cages, though some have grown well beyond the cages and don't seem to suffer from herbivory. *Lilium pardalinum* ssp. *pitkinense*, the rare Pitkin marsh lily, stands out above the rest. It is planted in a soggy island in a pond where it gets less than a half-day's sun, and also in clay soil next to a road in full sun, where it has gone through very dry periods. In both locations it flowers profusely and continues to expand underground. I have since divided and planted it elsewhere, without cage, as an experiment.

Three *Allium* species are worth special mention. A planting of *Allium falcifolium* in our serpentine beds seeds around and puts on a very nice display of flowers in spring. It seems to do very well with little or no supplemental water on a rocky slope in full sun. *Allium hyalinum*, with its thin grasslike foliage, has formed a dense mat in one bed and appears to both clone and seed vigorously with very little care. And then there's *Allium unifolium*. It has no problem naturalizing—I would consider it a weed if it weren't so attractive and ephemeral. It certainly has a place in some situations, but beware its somewhat aggressive nature.

The collection has many *Triteleia* species, including forms of *Triteleia laxa* in various lavender hues and a few whites. This is a robust bulb that has managed to naturalize in many areas: in beds where it was not planted, in beds that get some summer/fall irrigation, and in beds that get absolutely no supplemental irrigation. It has even persisted well in areas ravaged by gophers. I am always impressed by the large lavender fireworks that pop up in spring. Equally vigorous and impressive is *Triteleia peduncularis*,

planted in several different areas and naturalized by seed in others—seep areas, a creekside where it must be soggy all winter/spring and perhaps moist throughout the year, and even in non-irrigated beds. The different accessions vary in flower size, height, and degree of purplish tint to the otherwise white petals.

In winter, the *Trillium* species begin to rise and slowly unfurl flowers in shades from white to green to maroon. They form large colonies and seem to be invulnerable to pests and herbivory. They thrive where many plants would not, in hard-packed clay under heavy oak leaf mulch.

Toxicoscordion, *Chlorogalum*, and *Hastingsia* are all bulbs that have done well in various plantings and have often naturalized. *Toxicoscordion* and *Chlorogalum* are borderline weedy in a few beds. In

winter and spring, they really fill out some areas and, although not as showy as some of the other bulbs mentioned here, they are an integral part of the California flora and well represented within the general collection.

Brodiaea is another genus whose species are well represented in the collection. *Brodiaea californica* has naturalized beyond the original caged plantings in several areas and provides a nice finale to the summer-dry bulb succession. The flowers, white, lavender, or pinkish, look great above larger bunchgrasses such as

Festuca californica and *Calamagrostis ophiditis*. *Brodiaea kinkiensis* has also managed to naturalize and defy the gophers in some very rocky clay soil.

Several species of *Dichelostemma* have naturalized in the collection and put on quite a show. The serpentine bed contains a large colony of *Dichelostemma volubile*, which starts off as a turf of pink and green foliage in winter, then quietly snakes through the shrubs above it to top them with a fine display of pink flowers in spring. The variable hues and size of the different *Dichelostemma capitatum* accessions in the bulb beds are also worth a look in early spring, when it is the first of the themids to flower.

Information about the UC Botanical Garden, visitor's information, and events can be found at the garden's website: <http://botanicalgarden.berkeley.edu/>.



Lilium pardalinum, photo by Nhu Nguyen.

Some Amaryllids from the UC Botanical Garden Collections: *Boophone*, *Brunsvigia*, and *Haemanthus*

Meghan Ray

Meghan Ray is a horticulturist at the UC Botanical Garden in Berkeley. After working many years at the Brooklyn Botanic Garden where she grew a variety of cold hardy bulbs, she has enjoyed exploring the possibilities of gardening with species she previously only knew from the greenhouse.—Ed.

Bulbs of the amaryllid family have been among the most satisfying and successful geophytes growing in the South African section at the University of California Botanical Garden (UCBG) at Berkeley. Spectacular in leaf and flower (and even just in bulb), they provide welcome interest at times of the year when many other plants are dormant. They are also great teaching tools, offering interesting lessons about environmental adaptations and survival strategies. In this article, we will look at some of the UCBG holdings of

three genera, *Boophone*, *Brunsvigia*, and *Haemanthus*.

The amaryllid family displays a wide variety of adaptations to the diverse habitats that host this mutable group. Amaryllidaceae

is a large family with 59 genera and more than 800 species. Although the family is cosmopolitan, many of its members are concentrated in the Andean region of South America (28 species) and in southern Africa (18 species). In southern Africa, the amaryllids range from summer to

winter rainfall regions and have adapted their growth strategies to suit these climates. Most have perennial roots and the leaves and flowers arise directly from the apex of the bulb. They often flower in the late summer and autumn just before the leaves appear at the start of a new growth cycle. The flowers in this family are arranged in an umbel and are frequently showy. The dried inflorescence eventually breaks away from the plant and rolls, tumbleweed style, dispersing seeds as it goes.

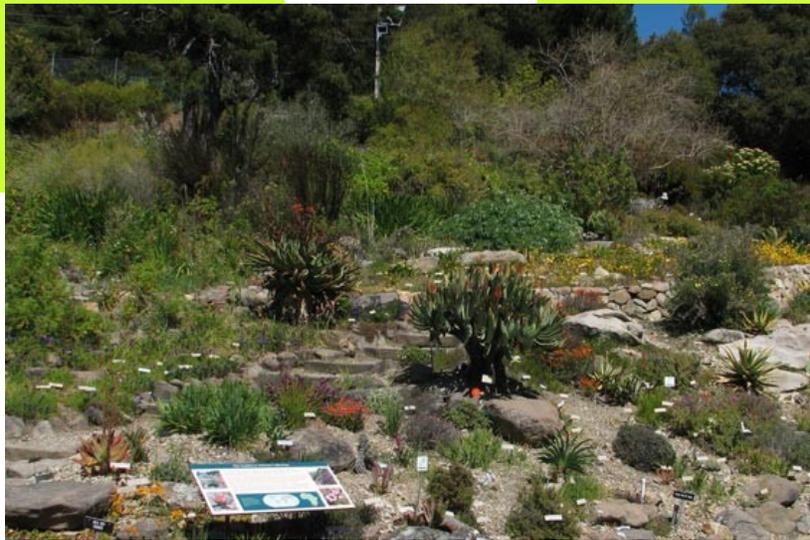
Bulbs in the UCBG collections are grown according to their geographic distribution. In the Southern African section, we have acquired bulbs from various sources including collecting trips, commercial growers such as Silverhill Seeds, collector donations, and from other botanical institutions. In 2003 we accepted the bulb collection from the University of California–Irvine, greatly increasing

our representations of South African bulbs.

The native soil in Berkeley is heavy clay. Since many bulbs prefer light, well-drained soils, cultivation can be a challenge.

For the southern Africa display, some sections of the garden were completely excavated and the clay soil replaced with a sandy, freely draining mix. In other areas, we have amended the soil with compost to improve the soil texture. It also helps that the garden is located on a steep slope and the displays often include rocks and boulders that are used to create pocket environments. Although many of the Eastern Cape bulbs we grow would prefer

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Top: The South African bed at the UCBG; photo by Nhu Nguyen. Left: Leaves of *Boophone haemanthoides* fan out at UCBG. Above: *Boophone disticha* flowers in Tanzania; photo by Hans Hillewaert.

Some Amaryllids from the UC Botanical Garden Collections (cont'd)

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drier winter conditions, they seem to be persisting through our wet winter conditions.

Let's look at some southern African amaryllids of high horticultural merit that have performed well at the UC Botanical Garden.

Boophone

Boophone is a genus comprised of two southern and tropical east African species, *B. haemanthoides* and *B. disticha*. The proper spelling and pronunciation of the name is often a subject of controversy, but currently *Boophone* (bo-off-on-ee) is preferred, from *bous* (ox) and *phonos* (slaughter), due to the bulb's poisonous nature. As so often with "poisonous plants," *Boophone* bulbs have many medicinal uses, especially as dressings for cuts, sores, boils, and burns. The plants have a large, above-ground bulb and make a fan of showy leaves. They are found in dry grasslands throughout southern Africa. Both species are very long-lived; some of the largest bulbs found in the wild are well over a hundred years old. Flowers are large, dense umbels that are often fragrant. They range in color from cream to red. The plants require good drainage, full sun, and resent disturbance once planted.

Boophone haemanthoides is found in the winter-rainfall region of southern Africa where it ranges from northwestern Namaqualand to Langebaan and the Bokkeveld Plateau. They prefer summer-dry conditions and well-drained sandy soils. Here at the botanical garden, we have a large specimen that came to us from the UC Irvine collection, wild collected in 1983, and also a later accession collected by Cameron McMaster and received in 2008 that is quickly catching up. The attractive leaves of this species

appear in the late autumn and last through the spring. The summer flower is creamy to pinkish red and short-lived, but the spent inflorescence is decorative and persists

ranos in 1968.

Brunsvigia

The genus *Brunsvigia* is endemic to southern Africa and contains about twenty species. The name



Top: A hummingbird seeks succor from *Brunsvigia josephinae*. Bottom left: The leaves of *B. marginata* emerge. Bottom right: *B. grandiflora* blooms. All photos taken by Nhu Nguyen at UCBG.

for several more weeks.

Boophone disticha is found in both winter- and summer-rainfall areas and the growth pattern of different populations depends upon their location. In the eastern species, flowers appear in the spring followed by the foliage. The UCBG example is from the Eastern Cape, collected by J. J. Lav-

Brunsvigia is in honor of Karl, the Sovereign of Braunschweig who supported the study of plants including *B. orientalis*. These are herbaceous perennials growing from a
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Board of Directors Meetings, July & November 2013

Since we've been without a newsletter editor for some time, we haven't been able to share meeting minutes with you – but we've still been meeting regularly to discuss PBS business! All members of the Board of Directors were present at our meeting on September 14, 2014.

The first topic of discussion was the status of the newsletter. As we continue to seek a full time editor, Nhu volunteered to step in as a guest editor for this issue. Thanks to him and to Jane McGary, who volunteered to copy edit for us.

Dell has two helpers, Karl Church and Steve Marak, working on the SX; thanks to them as well. We always welcome donations, and Dell would particularly appreciate donations of cold hardy bulbs.

John continues to work on our incorporation status, and has made good progress. This long process has an end in sight!

Our membership continues to grow. At the time of this meeting, we had 342 members.

As we look towards the future, Nhu indicated that David Pilling, who oversees the PBS YouTube channel, is looking to upload more videos. Check out what's there already! <https://www.youtube.com/user/PacificBulbSociety>

PBS would also be happy to sponsor local get-togethers. If you're interested in hosting one, contact Nhu.

The board also discussed the possibility of establishing a scientifically-oriented publication. A committee has been formed and continues to investigate possibilities.



Treasurer's Report, 1st and 2nd Quarters 2014

BALANCE	\$32,644.55
U.S. Members	\$1,040.00
Overseas Members	\$1,275.00
Contributions	\$76.00
BX Receipts	\$5,724.34
Investment results	\$3,737.66
TOTAL INCOME	\$11,853.00
BX/SX Postage	(\$1,957.67)
BX/SX Supplies	(297.69)
BX/SX Support Staff	(\$16.45)
Board Conference Calls	(\$120.91)
Treasurer's Supplies	(\$689.71)
Total Publications	(\$1,675.00)
PayPal Expense	(\$313.81)
Postage	(\$3,954.00)
TOTAL EXPENSES	(\$9,025.24)
NET CHANGE in account	\$2,827.76
BALANCE	\$35,472.31

PBS is on YouTube!

Explore all the videos of bulbs and bulb related topics. Watch time-lapse videos of bulb flowers captured by David Pilling or a tutorial on how to clean seeds by Gastil.

<https://www.youtube.com/user/PacificBulbSociety>

Become a contributor! Just open your smart phone and get started. What's blooming in your garden? A weekly update would be wonderful! We'd also appreciate in-depth tutorials such as mixing growing medium to planting amaryllid seeds. Wiki Director David Pilling will provide assistance to upload your video. It's that easy!



PacificBulbSociety uploaded a video 1 year ago



Cleaning seeds
by PacificBulbSociety
1 year ago • 45 views
Gastil shows how to clean seeds



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Whether renewing online or by mail, please contact Jane McGary (janemcgary@earthlink.net) if any of your contact information has changed.

**Thanks again for your continued support of
the Pacific Bulb Society!**

Some Amaryllidids from the UC Botanical Garden Collections (cont'd)

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true bulb and range in size from petite to gigantic. In fact, *Brunsvigia* bulbs are some of the largest produced by any plant; they can weigh more than one pound (454 grams) and can be up to two feet (0.6 meters) in length. The leaves are produced in pairs, frequently lying flat on the ground but occasionally growing upright, as we find with *B. josephinae*. The flowers of winter-growers usually appear in the summer or autumn, while the summer-growing flowers show up with the leaves in spring and summer. After fire, *Brunsvigia* species can cover an entire hillside with their spectacular blooms. The nondormant seeds are borne in dry capsules.

Brunsvigia grandiflora is a grassland species from the Eastern Cape to KwaZulu-Natal. Its twisty upright leaves are produced somewhat late in the growing season. The large pink flowers appear while the foliage is still present. Some of our current accessions were collected by Cameron McMaster from Cathcart, Eastern Cape Province.

Brunsvigia josephinae is a winter-rainfall species from the Western Karoo to Worcester, Malgas to Willowmore. It has the largest bulb and biggest flowers of the southern African bulbs, a region with many contenders for that title. Giant in all its parts, the enormous bulb produces up to twenty upright gray green leaves in the winter that dry up in late spring and are followed by enormous red flowers in the summer, surprising garden visitors with both their startling size

and the intensity of their red flowers. Our specimen comes from Wayne Roderick and was collected near Worcester by J. J. Lavranos in 1973.

Brunsvigia marginata is a western species that ranges from Citrusdal to Worcester. It produces four dark green, prostrate leaves per season. These have handsome, narrow red margins. The leaves grow over winter, becoming deciduous as the dry season progresses. The summer brings a spectacular, glittery, bright orange-red flower. At the botanical garden, we have a thirteen-year-old specimen from Silverhill Seed.



Top left: *Haemanthus humilis* ssp. *hirsutus*. Top Right: *H. albiflos*. Bottom: *H. coccineus*. All three were photographed in the UCBG by Nhu Nguyen.

Haemanthus

The genus *Haemanthus*, from *haema* (blood) and *anthos* (flower), is comprised of twenty-two species. They occur in southern Africa, in particular in the arid region of central and western Namaqualand and especially in the country west of Springbok. Fifteen species are found in the winter-rainfall region and six are found in the summer-rainfall region. Only *H. albiflos* spans both the winter and summer rainfall areas from Zululand to Still Bay in the Southern Cape. Species concentration is

more uniform in the eastern regions. Most species have wide distributions that are found either in the highveld grasslands or in the coastal belt. The genus is also represented in central and southwestern Namibia and in southern Mozambique. It also occurs in Lesotho and Swaziland. *Haemanthus* species are bulbous geophytes with perennial fleshy roots. The flowers are often showy, and the flower color is characteristic of its distribution: eastern species vary from white to

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Some Amaryllids from the UC Botanical Garden Collections (cont'd)

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pink; western species are predominantly red with some pink outliers.

The species from the western parts of southern Africa are all winter-growing with a distinct summer dormant period. Those from the summer-rainfall parts are mostly summer-growing and dormant in winter.

There are also three evergreen species: *H. albiflos*, *H. deformis*, and *H. pauculifolius*.

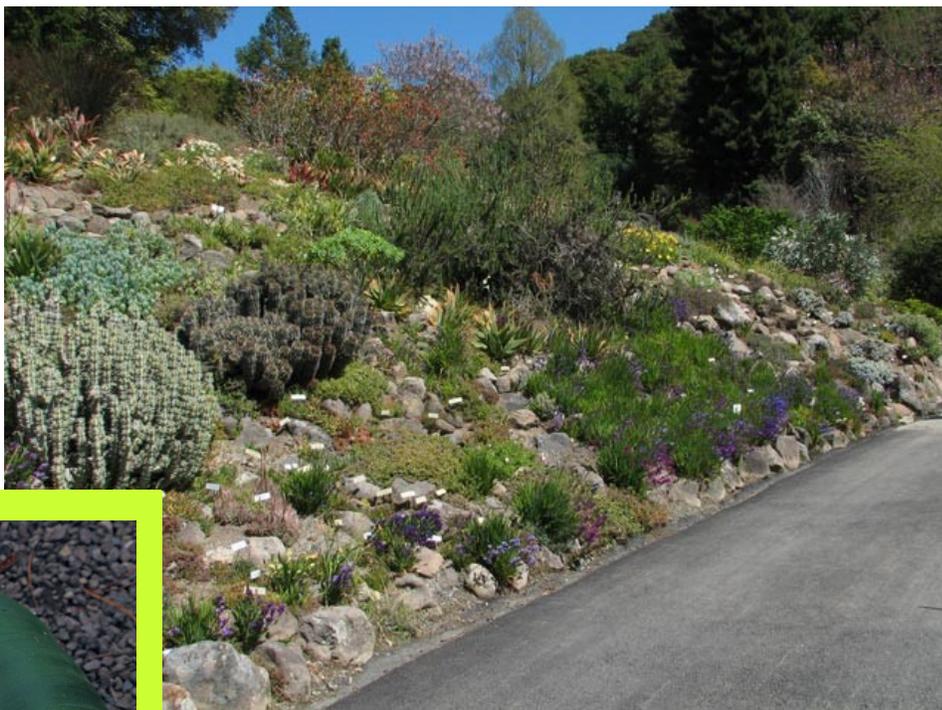
Haemanthus albiflos is an adaptive and versatile species found in many habitats. It can be found growing on the forest floor, at the seashore among the rocks, in coastal dune forests, on exposed valley cliff faces, or in shady places in the inland mountain ranges. It has dark, evergreen leaves. The bright white flowers have yellow anthers and appear over a long period. The seeds are borne in fleshy berries that can be brightly colored. At the botanical garden, we grow specimens from KwaZulu-Natal originally from UC-Irvine collected from seed in 1985.



Haemanthus coccineus is the most widely distributed of the winter-rainfall group. The enormous range has led to a very variable species. *H. coccineus* often has large, green gray leaves that are quite attractive. The flowers and spathe valves are bright red and reminded European botanists of tulips, thus giving the plant its common name, Cape Tulip. Some of the best examples of the species at the garden were collected from Mount Middelberg in the Cedarberg Wilder-

ness. They are from the UC Irvine collection and were grown from seed in 1985.

Haemanthus humilis subsp. *hirsutus* is a subspecies of the distinct but highly variable species, *H. humilis*. The leaves are large, felty, and gray-green and are present together with the flowers, which appear in the spring and can range from pale pink to white. Our accession is from a col-



Left: *Haemanthus deformis*, photo by Mary Sue Ittner. According to Plantzafrica.com, Sir Joseph Dalton Hooker named *H. deformis* in 1871; the name *deformis* was most likely chosen as a commentary on the "short, bent flower stem" as well as "the extraordinary manner in which the flower head appears in the center at the base of the two evergreen leaves." Above: Another overview of the South African Collection; photo by Nhu Nguyen.

lecting trip in 1991.

The amaryllids from southern Africa have been excellent horticultural subjects here at UC Botanical Garden in Berkeley. They have been easily propagated from seed and many are growing successfully in the ground. Once they reach flowering size, they have been very reliable bloomers and even those plants that have a short blooming period leave behind an attractive inflorescence that extends the period of interest.

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Gardening with Bulbs



The Giant *Coreopsis* blooms in the California collection at the University of California Botanical Garden; photo by Paul Licht. In this issue, Ben Anderson takes us inside the UCBG's California collection and Meghan Ray introduces us to their southern African collection.

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