

Collection Security for Rare Cultivars and Succulent Plant Introductions

A report on the 2008-09 Saratoga Horticultural Research Endowment

Fall 2009

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Report on the Grant

We protected the germplasm of many rare cultivars through the propagation and distribution to other institutions of the Robert Grim hybrids, Victor Reiter hybrids, and Frank Reinelt hybrids of *Echeveria*, *Graptopetalum*, *Cremnophila*, *Sedum*, and *Pachyphytum*, as well as species and potential cultivars in the genus *Dudleya*. We distributed the exceptional plants of long-term selection and hybridization research in order to provide collection security for those yet-to-be-introduced or barely introduced plants. Some of the plants selected have been trialed for well over 20 years in California. We made progress towards introducing some of these exciting plant materials for California gardens and landscapes. We had very good success with the project.

We acknowledged, in the press, the Saratoga Horticultural Foundation contributions to the distribution of plants through sales and to gardens. The successes ranged from maintaining rare clones to propagating so many of a cultivar that we could sell many of that particular clone. We hybridized new combinations, planted seeds, potted plants on, and saved seeds.

In addition, we conducted research about which plants, through an occasional sharing of a cutting or two, eventually became named somewhere else as cultivars. Some of this naming took place without the knowledge of the hybridizer. There were some choice forms that we were fairly certain had not been distributed or named. This investigation into names also helped confirm that many of the hybrids had not leaked out of the collection.

Publicity

McCabe, Stephen. 2009. Arboretum hosts wreath, plant sale. Santa Cruz Sentinel, Saturday, November 14, 2009. p. B5. Print and on-line editions.

http://www.santacruzsentinel.com/community/ci_13787070

----- 2009. Not in Kansas anymore: Exotics, California featured at Oz-themed plant sale. Santa Cruz Sentinel, Saturday, October 3, 2009. p. B4. Print and on-line editions.

http://www.santacruzsentinel.com/homeandgarden/ci_13476897

----- Spring 2009. New *Pachyphytum* and *Echeveria* hybrids available soon. The Bulletin: A quarterly publication of the Arboretum Associates, v. 33, #1, p11.

<http://arboretum.ucsc.edu/pdfs/BulletinSpring09.pdf>

Invited speaker:

26th Succulent Plants Symposium, 5, September 2009, Huntington Botanical Gardens. Dudleya: Taxonomic Adventures and Rare Morphologies.

Lecture:

Monterey Bay Area Cactus and Succulent Society meeting at the Arboretum. Oct. 18, 2009.

Goals

We were successful in reaching our goal of providing security for some of our candidates for cultivar status that are represented by the fewest numbers in the collection and to introduce relatively new cultivars to California gardens and landscapes. We distributed some of the duplicate back-ups to other gardens, which in addition to providing back-ups for our plants, will hopefully benefit the public displays at these gardens. These goals are in line with the long-term goals of the Arboretum and the Saratoga Horticultural Research Endowment.

The International Succulent Institute at the Huntington Botanical Garden had lost all of its plants of the Grim hybrid, X *Cremnosedum* 'Crocodile'. We supplied them with a replacement.

Greenhouse

We had started to use the greenhouse before it was quite completed. At about the start of this project, we emptied the 1/3 full, 960 sq ft. greenhouse, weeded, put down weed cloth, returned the plants and then later assembled new benches to fulfill the requirement to build new benches. The greenhouse is now full, primarily with *Echeveria* and *Dudleya*, *Echeveria* hybrids and their relatives.

Propagation, sales and distributions:

("Distributions" refer to distributions to partners in this grant. "Sold" means sold at public sales. Numbers don't include those distributed to partners.)

Echeveria laui X *E. lindsayana* Robert Grim hybrid. Propagated.

Graptopetalum amythystinum X *E. laui*. Increased numbers from 5 to 14. Difficult to grow in a cooler greenhouse, exposed to the rain, so moved back into a covered greenhouse.

Cremnophila nutans X *Echeveria lilacina*. Thicker leaves. Grim hybrid. Increased from 2 to 40 plants. Good potential as an introduction.

Cremnophila nutans X *Echeveria lilacina*. Thinner leaves. Interesting color. Increased numbers, but will discontinue from the program, too many disease problems.

X *Graptoveria* 99.270. Increased from 3 to 10 plants. Very attractive wax and color.

Echeveria fulgens X *E. obtusifolia*. Increased from 10 to 60 plants.

E. leucotricha X *E. derosa*. Increased from 1 to 4 plants, and distributed.

E. leucotricha “hybrid or selection”. Increased from 5 to 18 plants.

E. agavoides marginata X *E. pulidonis*. Propagated and distributed.

Sedum veradense X *Echeveria rosea* A Robert Grim hybrid. An attractive rock garden plant with orange-rose foliage. We planned to introduce this. Unknown to Grim, it had already been named after him. His wife, Margaret had likely given a cutting to a friend, Joyce Hoekstra of Squaw Mountain Garden Nursery, who had a nursery, and was active in the Sedum Society. She has passed away as has Margaret Grim. Apparently Joyce named the plant *Sedum* or X *Sedeveria* ‘Robert Grim’. She probably sold some. The plants have been distributed by the Sedum Society in England as ‘Robert Grimm’. We propagated and sold plants at our Spring and Fall Sales and distributed them to most of the partners. We sell it as *Sedum veradense* X *Echeveria rosea* ‘Robert Grim’. Propagated, sold, distributed to gardens.

Echeveria lilacina X *Graptopetalum amethystinum* There was a lot of research trying to find out the history of this one. We thought this was an unnamed Robert Grim hybrid. It has beautiful lilac-colored waxy leaves and is far easier to propagate and grow than *E. lilacina*. It looks to have had a similar naming history as ‘Robert Grim’. It was probably named ‘Margaret’ after Margaret Grim. Once in Europe, someone started calling it ‘Margaret Rose’, which is what one of the English princesses is called. We started with approximately 60 plants in cultivation, sold many, distributed some to partners, and destroyed some suspected of being diseased. We have managed to propagate enough to have increased the numbers so even after sales, we have over 120 plants. We have worked to return its name to ‘Margaret’ to reflect more accurately who it was probably originally named for. Propagated, sold, distributed to gardens.

A plant we knew Bob had given away on more than one occasion, *Echeveria colorata lindsayana* X *Echeveria* ‘Lind-el Bedder’ was propagated. We discovered it had been renamed and distributed by the International Succulent Institute and The Huntington under the name *Echeveria* ‘Ghost Buster’. Propagated.

X *Graptoveria* ‘Blush’ Increased from 1 to 2.

Echeveria longissima hybrids. Propagated and started to sort them out.

X *Cremnosedum* “Crocodile”. Uncommon, but occasionally available. Propagated, distributed and sold.

X *Cremnosedum* ‘Little Gem’. Grim hybrid, available in several countries, but propagated anyway and sold.

As promised, we planted more than the 1000 additional seeds of second and third generation seedlings of *D. pachyphytum* X *D. anthonyi/pulverulenta*. Many of the seeds sprouted.

We planted more than the 800 additional seeds, as promised, of selected red forms of seedlings of *D. cymosa* subsp. *ovatifolia* X *D. edulis* and *D. cymosa* subsp. *ovatifolia* X *D. multicaulis*. Many of the seeds sprouted. We selected red ones from the previous year’s plantings also.

We continued to grow and propagate *Dudleya* ‘Blush’, a hybrid of *D. cymosa* subsp. *ovatifolia* X *D. edulis*, that had a limited distribution at the Cactus and Succulent Society of America Convention in 1995. The growth of these plants seemed slow this year.

Dudleya: [*D. farinosa* X *D. cymosa* subsp. *pumila*] X *D. anthonyi*. Maintained this plant. We numbered and propagated over 80 additional very white leaved hybrids.

Additional notes included in part because of corrections made here to the “Echeveria Cultivar” book.

E. albicans X *E. lindsayana*. Propagated about 20 of these. Found a picture of a hybrid of the same name with identical morphology in Lorraine Schulz and Attila Kapitany book, “Echeveria Cultivars”. It is in the section titled, “Unnamed Hybrids”. They are from Australia, but traveled widely, and photographed some plants at the greenhouses of Naomi Bloss, who is one of our dedicated volunteers with whom we shared many plants that survived until a wildfire took out 2000 sq ft of her greenhouses. She may have sold some to Kapitany. This hybrid, however was photographed in the garden of Bev Spiller.

Echeveria diffractens X *E. carnicolor*. This also appeared in the Schulz “Unnamed Hybrids” section. This hybrid was photographed in the garden of Bev Spiller. We have two.

E. diffractens X *E. gibbiflora*. Another Grim hybrid. Ours doesn’t match the color of the one in the Schulz “Unnamed Hybrids” section. Grim made several of this hybrid, but saved one. The one he selected to keep is purple, rather than green.

E. pulidonis X *E. [colorata] lindsayana*. This matches a photograph and the name Grim originally had on this hybrid that also appeared in the Schulz “Unnamed Hybrids” section as one photographed in their collection. See next entry also.

E. pulidonis X *colorata lindsayana* and/or X *lilacina*, several clones. Blue-white with red edges (red leaf margins). Maintained.

Echeveria gibbiflora 'Bronze Giant' by Bob Grim. A few have been sold over the last 20 years, but this does not appear to have gotten into the regular nursery trade. We propagated about 15 and distributed some.

E. 'Brown Sugar'. "Unknown origin." Looks like *E. atropurpurea* X *E. carnicolor*. Possibly may have been a Reiter, Reinelt, or Grim hybrid. We got ours from Jack Napton, who had plants from each of them. We lost ours in the 1990 freeze.

E. pulidonis X *colorata lindsayana* hybrids. Green with red edges. Grim had several sister seedlings. One apparently is pictured in the Schulz book as "Of unknown origin". It has been called 'Christmas', though that name is also in use for another *Echeveria*. We have propagated and distributed several. We will name the best one (91.18) and try not to sell the others. It may be better than the one shown in the book.

E. 'Dr. Butterfield'. Victor Reiter gave us this one and said Harry Butterfield spoke at club meetings with such authority that "I call it Dr. Butterfield, rather than Mr. Butterfield". The Schulz book has it as "of unknown origin" and just a selection of *E. runyonii*. Reiter said it was a hybrid and made it sound like it might have been hybrid. I'll look into this more. Fairly widely distributed and safe in cultivation.

E. 'Jade Star' B. Grim. A choice plant. Our introduction, but probably not sold anywhere else yet. Slow to propagate, but we made some new ones and distributed one. Schulz has it incorrectly as "B. Grimm", but without pictures.

I made many additional crosses. The students and volunteers cared for and potted up many, many plants.

Dudleya seedlings. Many for horticultural, not botanical research. Hybrids and selections > 91 pots

Seedling flats: 6. Divided into 10 batches, including red seedlings, *D. pachyphytum*, *D. viscida*, *D. formosa*, *D. edulis*, and *D.* white leaved, hybrids

Mixed *Dudleya* flats. 18 flats X several hundred per flat. Many more than 3600 plants.

Mixed *Echeverias* open pollinated. 5 flats X several hundred seedlings. Many more than 1500 plants

Echeveria seedlings potted on: 62 flats X about 20 pots per flat, approx 1240 plants

Dudleya gnoma open pollinated selections: potted on 25 plants

Dudleya seedlings potted on 112 flats X approx 25 plants per flat, approx 2800 plants

Dudleya red seedlings potted. Approx 150 plants, in addition to young seedlings mentioned above.

Last year we were finally getting to the point where we had enough material and fortitude to do the traumatic deed of chopping off the heads of infrequently branching hybrids to produce more off-sets. This chopping has been done on the *Dudleyas*.

Seed envelopes or equivalents (equivalents. i.e. a big envelope with more than 5000 seeds could probably be divided up into 20 smaller seed envelopes)

17 seed envelopes. *Graptopetalum*, *Sedum*, *Echeveia*, *Tacitus* and intergeneric hybrids of the same.

2 *Graptopetalum* selfed (selfed=self-pollinated)

1 *Tacitus* selfed

19 *Dudleya* for conservation purposes.

15 *Dudleya* field collected

2 *Dudleya* species # 2, mutant with no petals

9 *Dudleya brittonii* or *D. pachyphytum* hybrids open pollinated

4 *Tylecodon* hybrids

67+ *Dudleya* hybrids open pollinated

30+ Big, white leaved Echeverias (*E. laui*, etc crosses by Grim) open pollinated

10+ Small, white leaved Echeverias, hybrids by Grim mostly, open pollinated

15 *Echeveria agavoides* hybrids open pollinated.

1 *Echeveria* sp.

1 seed packet: *Tylecodon* selfed

Replacement plants and research about cultivar names.

I visited Victor Reiter's garden and visited with his family. He passed away in the 1980's. The family gave us a replacement for one Arboretum plant, originally from Rieter, that was lost 20 years ago. It was a *Dudleya candida* cutting. Otherwise, we already had plants of the Reiter hybrids that remain at the family garden..

I visited Bob Grim two times as social calls, and phoned him three more to get more information about the history of his plants and their names. He is 95 years old and sharp mentally.

I exchanged several emails with the International Crassulaceae Network about names. Unfortunately, one of my two contacts, Al Waltemeyer, passed away.

I looked at the recent books on *Echeveria* and did on-line research.

I visited the Huntington Botanical Garden twice to compare our plants to theirs and exchange plants. I also visited Rancho Santa Ana twice and traded plants and visited the Santa Barbara Botanic Garden.

Deliverables, slight modification

One thing that did drop out of the grant deliverables was the publication of more information in the Cactus and Succulent Journal. When we received \$10,000 of the \$15,000 we requested, we did drop the emphasis on publication in the Journal. I did research for, but did not start writing up the material for two articles on Robert Grim. Some material in this report, could make up part of an article or two. We did manage to get the *Hakea* manuscript accepted and sent in a draft of a *Dudleya anomala* and hybrids paper, but there is more work to do yet on the latter.

It was not really part of the grant, but another success during the same time frame was the introduction of *Hakea clavata*. An article about this has apparently been accepted for publication by the Cactus and Succulent Journal (US). It is a beautiful, pink-flowered protea family member, that is semi-succulent, more drought tolerant in a pot than others in the family and is not

phosphorus intolerant like many species in the family. This was dropped from the grant, but we managed to propagate it, introduce it and publicize it.

Other *Dudleya* plants and seeds were collected during another research project, but are not itemized here as part of this grant.

Budget

Expenses

Description	Approximate Amount
Plant Introductions, publicity, writing final report: Salary. Plants were propagated for and sold at the Spring Sale, Fall Sale, and Dried Flower and Succulent Sale.	\$1850
Continuation of salary for temporary education/garden assistant. [Sara Reid] and salaries for Helen Englesberg, and other staff.	\$3315
Salary: Work-study students. (funds matched by federal government)	\$3000
Salary: Rick Flores, Curator of Native plants. Planting and maintaining plants in the native garden. Covered by other funds.	0
Key volunteers: Astrid Randall and Naomi Bloss, Ethan Amezcua	0
Dan Harder, Executive Director (salary covered by the University, not this grant)	0
Travel and mailing	\$800
Fertilizer, pots, labels, soil	\$175
Photo preparation, editing articles, and e-mailing to editors (covered by PI)	0
Benches for propagated materials. 128 sq. ft. to keep the plants above the reach of rabbits.	\$760
Total	\$10,000

Recap

We distributed cuttings and plants of the Robert and Margaret Grim Collection, the UCSC Arboretum *Dudleya* collection and the Reiter collection of Echeverias and hybrids. The Grim, Reiter, and other UCSC collections also had among them hybrids done by Frank Reinelt and others.

We distributed plants to public collections, distributing plants to more public gardens than we had planned in the original proposal.

At three sales, some lucky members of the public were able to purchase some of the plants propagated from the collections listed above.

We finished a greenhouse and put in some new tables in the greenhouse.

All-in-all we accomplished more than we had anticipated, but because of turmoil in staffing, delivered some things later than hoped (plants to UC Davis and SF State arrived much later than the others, during the week of November 29, 2009.)

Despite several significant obstacles, we delivered more than we expected we could. I would like to thank Sara Reid, Alec Christensen, Helen Englesberg, Astrid Randall, Ethan Amezcua, Teddy Dumont, Sylvie Childress, and Naomi Bloss for their help. UCSC Arboretum staff members also volunteered time to this project.

Partners

The following supported the project by accepting a significant number of the *Echeveria* hybrids and *Dudleya* species and *Dudleya* hybrids. We appreciate their time and support.

San Francisco State University, Martin Grantham

Cal Poly San Luis Obispo, Matt Ritter

UC Davis, Ernesto Sandoval and Warren Roberts (plants to be delivered by Dec. 4th or 8th)

California Succulents, Naomi Bloss

The Huntington Botanic Garden, John Trager

Rancho Santa Ana Botanic Garden, Bart O'Brien and Valentine Arvizu