Redbud Bulbs & Books Sale COMING UP!

This season, give gifts all the native-plant lovers in your life will love — give yourself something, too. Redbud is holding a special **online sale** from **Tuesday, November 10 through Friday, November 13**.

**Bulbs, Plants, Seeds, Books, and Merchandise!**

It’s time to plant native bulbs, and we are particularly fortunate that our Horticulture Chair, Nancy Gilbert, and her husband, Ames, ran a native-bulb farm for many years (Far West Bulbs). For this holiday sale, they’re making some of their stock available to Redbud to sell.

Naturally, you’ll find some plants, too, even selling at a bit of a discount. You’ll also find Redbud-theme tee-shirts and aprons as well as native-plant posters and “Native Plants Live Here” signs. We’ll also have both our Redbud books, *Native Wildflowers of Nevada and Placer Counties* and *Native Trees of Nevada and Placer Counties*. You can even buy seeds of some locally native wildflowers.

**Who Can Shop:** Anyone can shop this sale, members and the general public.

**When:** Tuesday, November 10, 8 a.m. Pacific Standard Time (PST) through Friday, November 13, 8 p.m. PST

**How to Order:** We’re using a new online site — [New Redbud Online Store](#). Do your complete order online, including payment.

**Pickup:** Pick up is Sunday, November 15. The pick-up process is the same as last time and at the same location.

Check out full details about the sale on the [plant sale page](#) on our [new Redbud website](#). Any questions? Please contact [nativeplanthelp@redbud-cnps.org](mailto:nativeplanthelp@redbud-cnps.org).
The 2020 Redbud Plant Sale in the Age of Covid

By Jeanne Wilson and Carol Thompson

Making this year’s plant sale a reality required hard work, enthusiasm, and creative solutions by our dedicated volunteers, but it was well worth it — both our volunteers and customers were thrilled that approximately 1000 native plants found new homes.

Mostly Local Natives
We couldn’t make as many plants available for sale as in past years. All our plants for this year’s sale were grown by three members of the Redbud horticultural committee and one outside vendor, a Redbud member who has his own nursery in Nevada City (Nevada County Native Plants). The vast majority of our sale plants were native to Nevada and Placer Counties.

Mock orange (Philadelphus lewisii) was one of the featured local natives available at our plant sale. It is a wonderful nectar plant for the pipevine swallowtail, shown here. Photo by Nancy Gilbert
Fewer Plants, Fewer Customers
At prior in-person sales, we have offered several hundred additional plants from commercial nurseries that grow high-demand plants in large quantities. Without these resources, we unfortunately ran out of several favorites earlier than we would have liked, such as coyote mint, California fuchsia, columbine, Dutchman’s pipe, redbud, western azalea, and several milkweed, manzanita, and ceanothus species.

Lemmon’s ceanothus (Ceanothus lemmonii) was a popular purchase at the plant sale. Photo by Chrissy Freeman

One positive aspect of the online format of the sale is that we now have a better idea of the relative demand for different species. Before, if a customer wanted a plant but we were sold out, we would never know. With written orders, we know how many of each species people wanted, which will help guide future propagation efforts.

Not as many customers participated as in previous years, likely because of the online format and somewhat complicated logistics. Part of the challenge of holding this sale was that, just a few weeks before the sale, we learned we could not use our online store and its built-in inventory tracking system for purchases, because of incompatibilities with the CNPS credit card processing client.

That meant reinventing the whole process in a matter of days. There were some glitches, but the response from people purchasing plants was overwhelmingly positive.

Successes We Celebrate
Everyone liked having the plant photos and descriptions available online for “window shopping” and making a plant wish list. At our end, having all purchases prepaid worked really well, so no delays in payment occurred because of long lines or issues with onsite wi-fi accessibility. And purchasers liked driving up and having their plants loaded for them.

Shout-Out to All Sale Volunteers
A big thank-you to all Redbud members who stepped up to help. We found that doing an online sale requires fewer volunteers than an in-person sale. More people volunteered than we ultimately needed; we appreciate all the support and willingness to help. A heartfelt “thank you” to all our volunteers who identified, pulled, and packed the plants for each order in labeled boxes; those who double-checked and made sure the orders were correct; those who warmly greeted customers, brought plants from the warehouse, and helped load cars, and those who helped with clean-up.
Moving Forward
After we finished with all sales, many of the remaining unsold plants were purchased by a local non-profit for restoration projects.

We’ll continue to have an online store to sell plants, bulbs, books, T-shirts, garden signs, and posters. Watch for announcements about ways to purchase in the coming months.

We learned much from our 2020 Fall Sale and look forward to improving the process. For now, we are waiting eagerly for the first fall rains (hope, hope!), and keeping a close eye on our plants until we can put them into the ground and watch them grow.

Coyote mint (Monardella villosa), an easy-to-grow local native available at our recent sale. Photo by Chrissy Freeman

The “Pressing” Life of a Native-Plant Taxonomist
By Chrissy Freeman

Hannah Kang discovered plants early. Even as a little girl she would press carefully picked flowers between the pages of the Yellow Pages or a thesaurus. Even when young, she enjoyed looking at plant field guides.

Connecting with Native Plants
When Hannah started college, she expected to be pre-med. That started to change when she took Shawna Martinez’s Botany class at Sierra College. “She fostered the botany experience in me,” remarks Hannah. “In Shawna’s class, my eyes were opened.”

From the time Hannah took Shawna Martinez’s class, she was “all about native plants. I had seen oaks all my life in Roseville. Once I took that first botany class, I just wanted to see why native plants have these adaptations. That’s why I went into plant ecology at first. And then I fell in love with plant taxonomy.”

“Native plants are irreplaceable. Some you can’t put in your garden, because they have such specific conditions.”

Identifying Plants Came Naturally
Once Hannah took a plant taxonomy class at UC Davis, she really discovered plant taxonomy as her path and let go of medicine completely. “I feel like I should have started with this!” she remarks.

Her taxonomy mentor, Ellen Dean, hired her as a student researcher, to work on Lycianthes (in the Solanaceae family, with tomatoes and potatoes). Hannah loved taxonomy, she says. “I loved finding out all the little details that only plant taxonomists care about. Ellen opened the door for me to find my passion. Identifying plants was so natural for me.”
Why Herbaria Matter to People Who Love Natives

During Hannah’s time working at UC Davis Herbarium, before and after she graduated, she curated about 1400 specimens, from as close as our local Sierra environs and as far away as Canada. Hannah describes a herbarium as a library of plants, each specimen as “a snapshot in time you can’t replace.”

Hannah considers herbaria the most important way to preserve native plants — the rare, the extinct, even the invasive. “They help us understand the ecological shifts in our plants,” she explains. “They harbor so much history, all revolving around California’s biodiversity.”

“For each sample,” she continues, “an herbarium has the date, the type of habitat, and the DNA that researchers sequence. Photos and notes, like CalFlora, don’t have the same data. Many botanists and researchers prefer herbarium specimens; online observations can provide only so much.”

Seeing Plants Through Hannah’s Lens

Like many botanists, Hannah photographs the plants she finds. She has uploaded over 2000 photos of native plants to CalPhotos. She also shares frequently on Instagram as Hannahandplants.

White globe lily (Calochortus albus), an example of how Hannah’s photos capture both beauty and essence. Hannah is particularly fond of Lewisia, such as this Kellogg’s Lewisia (Lewisia kelloggii).

Her favorite places to photograph and see natives are in our Northern Sierra. “I love the Sierra so much. I consider that my second home. I just feel at peace. I’m breathless each time I go somewhere new. The plants in the Sierra, they’re the same and different at the same time. You’ll see lots of corn lilies, Sierra Lilies. Then you’ll find a rare fern, Botrychium, something you’d never seen before.”

For native-plant enthusiasts who’d like to contribute their photos to CalPhotos or other science-oriented sites, she offers a couple of great tips. “Macro shots are good. But take pictures of the habitat as well. Also, take not just pictures of the pretty flower; take pictures of the stem, leaves, roots as well.”

Hannah’s recently been spending more time in the field, since she’s started working as a botanist for an environmental consulting firm. She conducts rare plant surveys, vegetation mapping, invasive plant surveys, and other floristic surveys, including preparing associated reports to support environmental permit applications.
The Role of Herbaria in Preserving California's Unique Botanical Heritage
By Hannah Kang
A typical day at a herbarium consists of making plant labels, mounting specimens...and possibly discovering a new species. The smells of fresh glue and plant matter waft through the halls of UC Davis Herbarium. A herbarium is a library of plants, and the UC Davis Herbarium has over 350,000 specimens. These pressed plants help researchers understand biodiversity, climate change and natural history.

Herbaria Offer Insights
California is a biodiversity hotspot, with thousands of rare and endemic plants. In a state that harbors so much biodiversity, these unique plants are cataloged in herbaria to help preserve that biodiversity.

Herbarium specimens don’t sway in the wind or set seed; they remain in their designated species folder in phylogenetic order (the evolutionary order...). These dead plants provide DNA and are snapshots from a period of time.

Pressed plants may not be as charismatic as in situ plants but can offer more insight. For example, herbarium specimens can be sequenced, which provides insightful DNA information; some sequenced specimens are up to one hundred years old.

Many researchers come to the UC Davis Herbarium to study specimens and to gather data. The Consortium of California Herbaria received funding from the National Science Foundation to digitize herbaria specimens in order to make valuable phenology data (about plant events throughout the year) more easily accessible.

Herbaria Help Us Learn About Climate Change
This new age of accessing herbarium specimens online reduces travel and more importantly allows researchers to study climate change. Many of California’s native plants are moving to find refuge; whether we observe that Yucca brevifolia (Joshua tree) are moving north or alpine plants are moving to higher elevations, plants know that their environment is changing. Herbaria specimens have recorded these types of changes for centuries. Some of California’s oldest herbarium specimens date back to the 1800’s and reveal the impact of human development.
Redbud Herbarium Talk Nov 7
Herbaria specimens enrich us with California’s flora and its history. Want to learn more about herbaria and their relationship to California native plants? Or find out how they benefit all lovers of native plants, including the vast majority who don’t consult them directly? If so, please watch my online Redbud talk November 7. See details in Events section of this newsletter.

Gearing Up for 2021 Native Plant Propagation
By Nancy Gilbert

Our fall plant sale was a nice success, in spite of all the challenges presented by the COVID-19 pandemic; our Redbud Chapter plant propagators are now gearing up to grow the native plants we will offer in the spring and fall of 2021. We welcome any CNPS members in our area to join us in this endeavor as home plant propagators. If you are interested in learning how to successfully grow native plants for our sale, please contact me, Nancy Gilbert, the Redbud CNPS Horticulture Chair.

Getting Started in Propagation
I recommend you start small by selecting a few fairly easy-to-propagate species to grow. Our plant propagation committee members can offer you guidance on species if you like. They can also give you advice on how to set up your growing area, tips on potting mixes, watering, fertilizing and much more. If you are growing plants for our sales, the Redbud Chapter will supply you with pots of various sizes, flats and plant stake labels, as well as reimburse you for expenses such as potting mix and fertilizer. In addition, we share and exchange native plant seed we have collected and also trade plants and cuttings for propagating.

Some Good Pots Wanted
This brings me to a request we have: If you have used plastic/poly nursery pots of certain sizes in good condition, we can clean them and reuse them. We are looking for:
- 2-gallon round containers (not 1-gallon containers, thanks; we have plenty.)
- 4” square pots
- mini- and regular-size deepots and treepots, (taller than usual pots and often used for native shrubs and trees with tap roots)

To donate pots or if you have questions, please contact Nancy Gilbert.

Seed Exchange in the Time of COVID
In past years, we have had our seed exchanges at a member’s home in November, and all members of our propagation group brought seeds to share and exchange. It has been a festive and fun event with anywhere from 10 to 25 participants. We shared much native plant, seed and propagation lore.

With COVID protocols, this year’s seed exchange will be restricted to people who will be propagating at least 50 percent of their plants for our plant sale, and we will likely have an outdoor seed pick-up location. Let’s hope that next year this pandemic is no longer a threat and we can return to the good old days of our socially un-distanced seed exchange!

An array of seeds available at an earlier Redbud seed exchange, about to go to new homes!
Featured Redbud — Shawna Martinez
By Chrissy Freeman

In our “Featured Redbud” series we focus on a Redbud member who has made noteworthy contributions to Redbud and to native plants.

In the beginning, Shawna Martinez’s grandmother would hold her hand to bring her into the garden. Decades later, Shawna has carried this love of plants forward, spending her career taking botany students by the hand (figuratively) out of the classroom and into the field to experience California native plants.

At her place on McCourtney Road near the Nevada County Fairgrounds, Shawna’s grandmother would show Shawna the plants and the insects. Not all the names her grandmother ascribed to the plants turned out to be correct, Shawna admits, but what really mattered was that “it stuck with me that plants are things, and that they are different from each other.”

Though Shawna gardened growing up, following in her grandmother’s footsteps, not until she was in college as a forestry major did she become interested in studying botany. “I was a terrible student,” admits this Nevada County native, “but when I got an A- in Tree and Shrub Identification, I thought, ‘Oh, I’m good at this!’” She went on to get an AA in Forestry from Sierra College, then a Bachelor’s in Resource Science (UC Davis) and a Master’s in Conservation Biology with an Emphasis in Botany (CA State University Sacramento).

A Statistic Turned Her Attention to Natives

What first sparked her interest in native plants was a statistic she learned in Botany class, that 90 percent of the below-canopy cover was of European origin. Shawna recalls, “My eyes just bugged out. So I started learning about the natives, and I began to revere them when I saw them.”

She credits two professors as instrumental in making her aware of plant ecology and native plants — Michael Barber of UC Davis, who authored Terrestrial Vegetation of California, and Michael Baad at Sacramento State, who taught Native Plant Identification. Along the way, Shawna adds, “I joined CNPS, and my insatiable appetite got fed.”

Not just her training as a botanist but her training in ecology informs her relationship with native plants. “The connection of how plants work and where they live is really awe-inspiring to me,” says Shawna. “The very first time I heard about mycorrhizae, I thought it was the most amazing thing I had ever heard. How plants and fungi work together, to form this enormous ecosystem underground, it makes you look at nature so differently. I don’t see just a tree, but I see all the connections.”
Starting Up Redbud

While finishing up her Bachelor’s at UC Davis and living in Nevada County, Shawna was attending meetings of the closest CNPS chapter to her home, the Sacramento Chapter. Tiring of that long drive to meetings, with the blessing of the Sac Chapter president (George Clark), she reached out to the members from Placer and Nevada Counties and asked about interest in forming their own chapter. “The response was overwhelming,” Shawna recalls.

Shawna served as our Redbud Chapter’s first president, then Education Chair for a long time. She has more stories to tell about Redbud’s early days. Someday, we’ll have an article that’s all about that subject!

Growing Students Who Know Native Plants

With her Forestry background, Shawna worked for the U.S. Forest Service for 12 years, including six years as a Rare Plant Botanist in the Tahoe National Forest. She started teaching Forestry at Sierra College, then Biology. Over her 33 years at Sierra College, Botany was her major course load.

It was hard to integrate native plants into the General Botany course, as it covers mostly the anatomy, physiology, and diversity of plant forms, Shawna noted. But she found inspiring and creative solutions, taking her students to Stagecoach Trail (in Auburn State Recreation Area) for a half day, where she’d focus on native plant botany. “I also did a plant of the week,” Shawna explains. “Every week for 16 weeks, I’d bring in a plant, and students had to learn that specific plant, its scientific name, family name, common name, and how to identify it. I’d often bring in a native plant but sometimes an invasive, either native or introduced.”

Later, says Shawna with a smile, “students would see that plant again and ask more about it.”

Trees and shrubs have probably been Shawna’s greatest area of focus around native plants. In the fall, she’d generally teach a wildland trees and shrubs identification class. She also taught Natural Resources Conservation, as well as diverse field courses all over California which she is continuing to conduct.

A Generous Life with Native Plants

During nearly all of Shawna’s time at Sierra College, she taught wildflower identification to novices each Spring. She’s planning to continue to do so, though not this coming year, as there’s “no way to teach this online.” Let’s stay tuned for this opportunity!

For many years, Shawna’s been supervising the herbarium at Sierra College. Now that she’s retired, she’d like to collect specimens for the herbarium, though she’ll have to wait a while, as she can’t access the herbarium while the campus is closed. Meanwhile, she says, “An herbarium is organizing information; we have an enormous database, and I love working on databases.”

She says, “Since I’ve retired, I’d like to get a little more involved with Redbud again.” She has already been lending her expertise to updating our plant list for Loney Meadows.
“I’d love to update plants lists and hike back to the same location several times over the course of the spring to do so,” she offers “and I’d love to get a hiking group together Shawna with some of her students after Covid” to do this.

Shawna is already contributing to Redbud Chapter again, having created and now putting finishing touches on refinements of a key to flowering plant families featured in the second edition of Redbud’s Wildflowers book. She even had her students use it so she could test and refine it; we hope to make it available online for everyone’s use.

Calling on her expertise in native dendrology, Shawna is also preparing a dichotomous key for the Redbud Chapter’s book, Trees and Shrubs of Nevada and Placer Counties. She notes, “The key may wind up online, or we’ll hand it out with the books.”

The Ecologist as Native Gardener

At her home in Loomis, Shawna has an area in which native plants particularly abound — California fuchsia (Epilobium canum), madrone (Arbutus menziesii), scarlet monkeyflower (Diplacus cardinalis) (which is “taking over the planet”), native Pacific strawberries (Fragaria vesca) as groundcover, California buckeye (Aesculus californica), several ceanothus species, pinemat manzanita (Arctostaphylos nevadensis) (in shade), and several oak species.

Shawna reveals that beauty is part of what catches her spirit about natives - “Redbuds line my driveway. You have to have a ceanothus along with a redbud, so you have the contrast of the bright blue and the pink. It’s just stunning.”

Another comment shows how Shawna, as an ecologist, naturally sees that our native plants are connected to the other elements around them, “I’m really proud of my Dutchman’s pipe (Aristolochia californica). It goes everywhere. Every year, the pipevine swallowtails eat it to the ground, and I have tons of caterpillars. This plant is disappearing in this area, because of development. You do see it in the canyons. The swallowtails always come. I’m amazed!”

Me-Wuk Manzanita – A Sierran Shrub with a Complex History
By Steven Serkanic

The 2013 American Fire burned over 27,000 acres of terrain on Tahoe National Forest’s isolated American River Ranger District located between Foresthill and the Lake Tahoe basin. The real work began for the US Forest Service (USFS) after this fire was fully contained. Their post-fire response protocol aimed to ensure the safety of publicly accessible areas, protect property, secure biological and cultural resources, and address the integrity of clean water sources. Such projects also provide employment opportunities for young professionals looking to apply their skills under the guidance of experienced agency personnel. For two seasons, I had the good fortune to be hired as a seasonal field botanist helping advance these efforts. I found myself intrigued by local manzanita species.

The Rich World of Manzanitas

Among the many special-status plants our team targeted during survey efforts following the American Fire was True’s manzanita (Arctostaphylos mewukka subsp. truei). As many know, manzanita is the common name for a species-rich group of shrubs in the genus Arctostaphylos. They are sclerophyllous (having resilient...
evergreen leaves with thick cell walls) shrubs that are tightly linked to fire and are iconic elements of California’s chaparral.

Few groups better symbolize the California flora. Of its over 60 species, most occur in the California Floristic Province (the Mediterranean-climate area of western North America, which includes most of California except the desert regions, plus small amounts of Oregon and Baja). For generations this group has triggered the imaginations of disputing botanists. Proof of this lies in the dizzying number of nomenclature changes — often name changes and modifications in taxonomic rank, such as elevating a subspecies to full species status, or vice versa — and hypotheses regarding the hybrid origins of various species. *Arctostaphylos* has been a source of both contention and curiosity for as long as botanists have been studying the California flora.

**What Makes Me-Wuk Manzanita So Intriguing?**

One such species, Me-Wuk manzanita (*A. mewukka*), has a colorful track record in the literature. It has long been the subject of speculation about potential hybrid origins. It is one of eight manzanita species known to occur in the Sierra Nevada mountain range. The Sierran cohort of manzanitas are morphologically divergent and have distributions that largely segregate across elevation, plant communities, and temperature regimes.

Me-Wuk manzanita is particularly interesting because it exhibits morphological characteristics that are intermediate with respect to the lower elevation whiteleaf manzanita (*A. viscida*) and the montane greenleaf manzanita (*A. patula*). Me-Wuk manzanita is also a tetraploid (four sets of chromosomes, two from each parent), whereas whiteleaf and greenleaf manzanitas are diploid (two sets of chromosomes, one from each parent). The nail in the coffin for the hypothesis about the hybrid origin of Me-Wuk manzanita is that fact that it has a distribution that overlaps greenleaf and whiteleaf manzanita, and prefers habitat where both these species grow.

**So Much Variation**

Our crew on the Tahoe knew that the special-status True’s manzanita is one of two subspecies of the Me-Wuk manzanita (*A. mewukka*). Some manzanitas have burl tissue (from which they can re-sprout after fire), and some do not. Based on the literature, we knew the type specimen (model example) of Me-Wuk manzanita had burl tissue (like many greenleaf manzanita specimens), and the type specimen of True’s manzanita lacked it (consistent with whiteleaf manzanita).

As field biologists, we crave these kinds of binary distinctions for the sake of streamlining a lengthy survey. This proved too rigid an interpretation in the case of Me-Wuk manzanita, however, as I later learned when revisiting this Sierran species complex for my Master’s thesis project at San Francisco State University.

The American Fire burn scar is found across low and mid elevations of the Tahoe National Forest, overlapping much of the contact zone where whiteleaf and greenleaf manzanitas meet. This zone is where Me-Wuk
manzanita occurs and where we focused the search for the special-status True’s manzanita. I was regularly
drawn to habitat where Me-Wuk, whiteleaf, and greenleaf manzanitas occur together.

My imagination was in overdrive as I spent two seasons attempting to make sense of all the variation I
observed at this mid-elevation zone. During this time I discovered the work of California botanists who had
been inspired by similar observations and patterns associated with this species complex.¹ I felt I had unlocked
a paper trail leading to a rich story that lacked its final chapter.

**Morphological variation in Me-Wuk manzanita**

**Why Plant Species Produce Hybrids**

Biologists nowadays have come to appreciate the importance of hybridization, particularly with regards to the
transfer of advantageous genetic material among rapidly diversifying groups of species. Plant groups known
for their potential to hybridize are often young, rapidly evolving, and have “porous” species boundaries.

Unlike humans and most other animals, plants survive with redundant sets of chromosomes. Whereas you
and I have two sets of chromosomes in each cell (one from mom and another from dad), which makes us
diploids, plants have a fascinating ability to thrive with four, six, eight, twelve or many more sets of
chromosomes.
Plants with redundant sets of chromosomes are known as polyploids. And when two diploid species hybridize and erroneously transfer unreduced gametes (each parent passes along diploid gametes), this can result in viable tetraploid hybrids. This type of hybridization occurs often in the plant kingdom (often with deleterious effects). When successful, it can result in a stable tetraploid hybrid entity that is referred to as an allopolyploid. These allopolyploids are largely reproductively isolated from their parents and can have strong species boundaries.

**Me-Wuk Manzanita Long Suspected of Being Hybrid**

Me-Wuk manzanita has long been suspected to be an allopolyploid resulting from hybridization between the diploid greenleaf and whiteleaf manzanitas. Kristina Schierenbeck addressed this question in the 1980’s under the guidance of the late G. Ledyard Stebbins.

Kristina collected data using morphological measurements and physical chromosome characteristics that supported the notion that Me-Wuk manzanita is the resulting allopolyploid between whiteleaf and greenleaf manzanita, albeit having formed at an earlier time and from evolutionarily younger forms of the respective parents. Tom Parker and I approached Kristina and suggested we revisit this classic study system with more modern tools.

**Is Me-Wuk Manzanita Actually a Hybrid?**

Research on the biology of allopolyploids suggests that these entities arise, not from a single hybridization event, but actually from untold numbers of hybridization events between respective progenitors. In the case of Me-Wuk manzanita, this would suggest that if whiteleaf and greenleaf manzanita are the progenitors, then Me-Wuk manzanita would have formed on many different occasions independently at separate locations where whiteleaf and greenleaf manzanita occur together. This arrangement has the potential to yield a species with a great amount of genetic diversity. It also offers a potential explanation for the impressive morphological variation of Me-Wuk manzanita seen across its distribution.

These hybridization events that lead to the formation of allopolyploids can exhibit reciprocal parentage. In this case, it would suggest that whiteleaf manzanita may be the mother at one location, and it may be the father at another. We used chloroplast sequence data (chloroplast is the maternally-inherited component cells in most groups of flowering plants) to test for parentage at separate locations throughout the distribution of Mi-Wuk Manzanita. Our results lacked support for the hybridization hypothesis. This was largely because we were unable to detect maternally-inherited chloroplast DNA of either whiteleaf or greenleaf manzanita in any of the Me-Wuk manzanita samples collected from across its distribution.

**Insights About Me-Wuk Manzanita and Its Relatives**

Instead, we found that Mi-Wuk manzanita shares a chloroplast with the common manzanita (*A. manzanita*), a widespread tetraploid that prefers
lower-elevation foothill woodland and savanna habitat. This came as a complete surprise. What was the chloroplast of a divergent species doing in this Sierran tetraploid?

It turns out that shared chloroplasts among separate species occurs with some frequency in outcrossing perennial plants. This phenomenon, known as chloroplast capture, has been documented among groups such as the oaks (*Quercus*), alders (*Alnus*), beeches (*Fagus*), penstemons (*Penstemon*), heucheras (*Heuchera*), and others. Chloroplast capture is a signature of hybridization.

The mechanisms of this usually involve an initial hybridization event, repeated backcrossing with one of the parents, and the reversion of the phenotype back to one of the parents through pollen-mediated gene flow. In this case, it suggests that at some point Me-Wuk manzanita may have picked up the chloroplast of common manzanita, or vice versa.

Details regarding the origin of the Me-Wuk manzanita remain uncertain. High-resolution tools that can unravel patterns occurring in the nuclear genome among members of this Sierran species complex offer the potential to deliver insight. What remains certain is that you never know where field travels will take you and what treasures they’ll reveal when accompanied with a sense of curiosity. In the words of CNPS San Luis Obispo chapter member Charlie Blair, “Keep going out.”

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Many thanks to Tom Parker, Kristina Schierenbeck, Mike Vasey, Bob Patterson, Greg Spicer, Felipe Zapata, Frank Cipriano, Scott Roy, Dave Graber, Kathy Van Zuuk, Bart O’Brien, and many others who were involved with this recent work. Their inspiration and enthusiasm reawakened the curiosity around this classic study system.

1. For relevant papers and more images, see the [PDF of this article](#) on Redbud website.

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**It’s All in the Family**

**By Justin Maciulus**

(Editor’s note: Justin owns Nevada County Native Plants, which furnished many robust local natives for our recent plant sale.)

Admiration, responsibility, and connection are three of many possible reasons that growing California native plants is becoming more popular every day. I cannot speak for others, but I know these perspectives are
where growing natives started for me, twenty years or so ago. As this interest and popularity of growing California native plants has escalated, so have what we consider when we decide which plants to grow and buy and how to use them in the landscape.

The more we observe and learn about ecosystem dynamics, relationships, sensitivities, and resiliency, the more finely and deeply we calibrate our admiration, responsibility and connection with native plants. I’d like to share my thoughts and considerations of the native plants I choose to grow for my nursery and for my landscape, though they are constantly evolving, works in progress. My perspectives come from my twenty or so years in field biology, horticulture, and conservation.

**Diversifying Plant Families in the Landscape**

I moderate a native plant propagation group on social media. When people ask to join the group, we request they answer three questions. The third question asks, “What do you hope to get out of this group?” By far the most common answer summarizes as, “I want to learn to propagate plants to host more wildlife and pollinators.”

I think many of us have heard the idea: to attract and assist monarch butterflies, plant more milkweed. Many testimonies attest to monarch success with milkweed plantings; other accounts contrast with that success. We’ve planted the milkweed, but have we planted alliance species in the same planting area to support more diverse food sources? We’ve provided food for the caterpillar, but have we also provided nectar for the adult monarch? The persistently increased rate of development and loss of natural habitat means simply planting milkweed alone will not suffice to sustain these organisms. The monarch is an iconic example, but by diversifying the plant families in our landscape, we can expand the availability of flowers in our landscapes throughout the year, which cultivates hospitality for biology. The prospect is exciting!

Composition is a commonly used word in landscape and garden design, whether thinking of how we assemble foliage textures; foundation, foreground, and border plantings; plants of varying heights; or other elements. But few people think about it in the context of species assemblages. How can we implement a variety of plant families into landscape composition?

![Photo by Shane Hanofee](https://example.com)

**Montane community made of members of rose family, (Rosaceae), evening primrose family (Onagraceae), knotweed family (Polygonaceae), buttercup family (Ranunculaceae), grass family (Poaceae), broomrape family (Orobanchaceae), sunflower family (Asteraceae), & carrot family (Apiaceae).**

When you walk onto a relatively natural landscape, this diversity of plant families is present. These plant families and the species they encompass are all the pieces needed to sustain that habitat and provide the benefits for both migratory and permanent resident insects and other animals.

**Plant Families for Landscaping**

Here are some very common plant families (with corresponding local-native examples) carried in the nursery trade:

*Redbud News, October 2020*
• Apocynaceae, Asclepias spp, milkweeds
• Asteraceae, Baccharis spp, coyotebrush
• Adoxaceae, Sambucus spp, elderberry
• Caprifoliaceae, Symphoricarpus spp, snowberries, and Lonicera spp, honeysuckles
• Ericaceae, Arctostaphylos spp, manzanita
• Fabaceae, *Cercis occidentalis*, western redbud, Lupinus spp, lupines
• Fagaceae, Quercus spp, oak
• Lamiaceae, Salvia spp, sage
• Malvaceae, Malocephalum spp, mallow
• Onagraceae, Epilobium spp, California fuchsia
• Phrymaceae, Diplacus spp, monkeyflowers
• Plantaginaceae, Penstemon spp, penstemons
• Polygonaceae, Eriogonum spp, buckwheats
• Ranunculaceae, Aquilegia spp, columbine
• Rhamnaceae, Ceanothus spp, California wild lilac & Frangula spp, coffeeberry
• Rosaceae, *Heteromeles arbutifolia*, toyon
• Saxifragaceae, Heuchera spp, alum root
• Liliaceae, Lilium spp, Lilies, & Calochortus spp, mariposa lilies
• Themidaceae, Brodiaea spp, & Triteleia spp, wild hyacinth

These families represent only a fraction of the number we’d find in a natural setting. What about the families that aren’t readily available? Are we limited by what is provided for us? To some degree, yes. But we can also begin to change this dynamic by requesting more native varieties from retailers. We must start discussing what we want to see more of.

**A Yampah Inspiration**

During the Summer of 2019, I took a long hot walk to find an annual grassland opening that was transitioning geologically into a ultramafic (rich in iron and magnesium, poor in minerals for plant nutrients) gabbro soil outcrop. As I approached this vista, the foreground was accented with chaparral sedge (*Carex xerophila*), gold wire (*Hypericum concinnum*), and gray leaved skullcap (*Scutellaria siphocampyloides*), all bound together like a omelette with a creeping sage (*Salvia sonomensis*) acting as the egg. The overstory was formed of the aromatic McNab cypress (*Hesperocyparis macnabiana*).

Vertically striking up through the low foreground composition, was Bacigalupi’s yampah (*Perideridia bacigalupii*), a member of the Apiaceae (carrot family) and a perennial herb found blooming in late summer.
As I approached the yampah, I noticed on it by far the most pollinator support I have ever witnessed. I saw four different pupa and caterpillars, one of them a monarch caterpillar; a tarantula hawk; multiple life stages of lady beetles; along with more that I wasn't able to identify. I could see perhaps 25 species of insects on one isolated colony of plants! This observation was completely enlightening and inspired me to attempt to cultivate this plant, realizing the important role it plays within this habitat.

If I grow this yampah by itself, will I see similar biological support? Or does simulating the natural ecology I saw require a composition containing all the other plants from other families? I hypothesize it’s the latter. If supporting the wildlife and offering more varied seasonal offerings is a desired attribute in my landscape, I’ll need to simulate my observations as much as I realistically can. I face quite the task to identify all these organisms, and comprehend their food (or host) plants and the timing of their productivity. Though complete understanding may not be possible, this is the propagation and landscaping goal I aim for.

**Leaf of Faith**

That observation of the yampah inspired me to cultivate this species, but where else does this go for me? I feel the Apiaceae (carrot family), to which it belongs, has been barely scratched for availability in the native-plant nursery trade. One of the first things I remember learning in the my horticultural education was how important dill is for pollinators and beneficials in the garden, especially if allowed to flower and set seed, just as I’d seen with the yampah.

The Brassicaceae family (mustard family) seems to be becoming more relevant. Wallflowers, (Erysimum) which belong to this family, have been common for decades, but I've seen expansion of availability among this family, such as more members of the rockcress genus, Boechera.

There’s always room for expansion in the sunflower family, Asteraceae. Myself I’m trying, hoping to bring in more discoid flower members like the pincushion genus Chaenactis. For those unfamiliar with the term discoid flower, sunflowers may have ray flowers, discoid flowers, or both. Discoid flowers are in the center of the most common sunflowers, surrounded by ray flowers.

Cultivating plants that are grown less frequently requires a leap of faith and brings more challenges. Many plants simply don't look or perform well when they are still container stock but thrive once installed in the landscape. Many of us as consumers love to see a vigorous full container with balanced root-to-shoot ratio, but sometimes we need to understand that some plants just don't do that well in a container, and what we are buying is a healthy root system that will establish well once placed in the landscape.

Promotion of less well-known plants adds challenges as well; many folks buy plants for which they have a previously established admiration. Beauty is in the eye of the beholder, and hopefully the passion of bringing a less well-known plant into the trade can be enough for others to take the challenge and leap of faith.

**Ways to Get Acquainted with Families**

Native plant enthusiasts come in many variations; and not all yet think about natives in terms of families. How can you begin to bring this into your wheelhouse? In every plant-related field of interest, whether botany, horticulture, or landscaping, plants are categorized. Landscapers may group plants into specific applications, such as border perennials or xerics. Plant families are just another way to categorize plants.

Don’t feel overloaded by those long family names; they are just labels. Sometimes you may recognize the roots of a family name (“Asteraceae” – family members have flower petals in rays, like asters); sometimes you won’t (“Onagraceae” – after a now-defunct genus name that included evening primroses).
● When you’re curious about a plant, simply query its name plus “plant family” in your browser. Maybe take it a step further to look at other genera in that family.

● Researching about a plant family and its relations requires an investment similar to researching its water requirement or exposure preference. For certain hiking locations, Redbud has plant lists (located in the “flora” tab) categorized by families. Print one out; just casually stare at it and resonate with it. Notice the plants common to you and the family they are in. Studying these lists also is a good way to learn how plants form their composition of community, known as plant alliances.

● Ask your local native nursery (or plant sale) if they have certain plants in the families listed on that plant list you studied. You can also use, as a catalyst, native plant websites that are suffused with plant biology and horticulture, such as Calscape — a phenomenal resource! (In Calscape, the plant family is listed for some, though not all, plant species.)

Just Another Way to Think About Plants

“There are a million ways to stack a sandwich,” as one of my mentors told me long ago. Mastering the topic I’ve raised here is challenging. Some plants are difficult, whether in propagation, cultivation, or habitat simulation, our focus here.

Along with other related topics like nativars (plants cultivated or hybridized to the point of sterility), hyper-local species (using species within a short radius from your planting site), and provenance (origin of propagule used to produce plant), does the topic of plant families simply add noise for folks just getting into native plants into the landscape, thus retarding or even halting their involvement?

I believe considering plant families doesn’t have to be like that. The moment you first consider this topic, you’ll find that family composition and plant alliances will fall into place. It’s just another way to think about the plants you’re working with, another way to act responsibly

through admiration and respect for the Golden State’s incredible flora. The challenge of diversifying the plant families in my landscape and tackling how to provide them in my nursery is how I’m stacking my sandwich.

Riparian community with members of the Sunflower Family (Asteraceae), Pine Family (Pinaceae), Broomrape Family (Orobanchaceae), Willow Family (Salicaceae), Carrot Family (Apiaceae), Pea Family (Fabaceae), and Grass Family (Poaceae)

Nevada County Conservation Advocacy Issues

Redbud Conservation Advocacy Committee
Let’s look at how a couple of proposed major Nevada County projects would impact native plants.

Proposed Reopening of Idaho Maryland Mine

Current Status: The mine has been closed for over 60 years, but a Canadian company has proposed to reopen and operate the mine.
After initial review, Nevada County has hired a consulting firm to prepare a Draft Environmental Impact Report (DEIR) on the proposed project. If approved, the permit would authorize the operation of the mine for 80 years, 24 hours a day.

The public will have a limited period of time to comment on the DEIR once it is completed and released.

**Native-Plant-Related Concerns:** The Redbud Chapter has submitted comments on this project, which would encompass over 180 acres in two parcels and would have major impacts, both direct and indirect, on local creeks, rivers, riparian areas, and wetlands and their associated native plants.

During the first six months of the project, the abandoned mine shafts, which have been filled with water for decades, would be “dewatered.” This would entail pumping 3.6 million gallons of water each day (2,500 gallons per minute, round-the-clock) from the mine to decontamination/filtering facilities.

Leaving aside questions about the sufficiency and effectiveness of the proposed processes to remove heavy metals and other contaminants from the mine water, the treated water will be released into the South Fork of Wolf Creek at the rate of 3.6 million gallons per day for six months (a total of 657 million gallons).

That increased volume of water will put the creek at perpetual flood stage for the entire six months, to the detriment of riparian plants that will be flooded or washed away. In addition, the increased flow would interfere with flowering, pollination, and the setting, dissemination, and germination of seeds. Also of concern are impacts on flora and fauna of resultant changes in water temperature, pH, and so forth.

“These high, artificial water discharges into the creek will disrupt the natural flow regime in the creek, disturbing the life cycles of the organisms that sustain the ecology of this riparian corridor.” Source: Community Environmental Advocates Foundation (CEAF) website, Idaho-Maryland Mine FAQ.

After the initial six-month “dewatering,” 1.2 million gallons of water per day – 438 million gallons per year – will continue to be pumped out of the mine and into the creek in perpetuity over the 80-year life of the mine and beyond, to keep the shafts free of water.

In addition to impacts near where the water from the mine is pumped into the creek, impacts will also occur downstream, on creeks, rivers, and wetlands, including seasonal and perennial seeps and springs. Several plants of concern are found in the proposed mine site and in the impacted watershed. Redbud is collaborating with the El Dorado CNPS Chapter and researchers from UC Davis to explore the genetics of Fremontodendron plants found at the project site.

For more information and maps of the proposed mining sites and mineral rights boundaries, see the website of the Community Environmental Advocates Foundation (CEAF). CEAF is a local non-profit organization that “works to promote public policy and actions resulting in responsible land use and environmental protection in Nevada County.” For questions, email mineconcerns@cea-nc.org

**Actions You Can Take**
- Attend a [public online meeting about the mine, with opportunity for questions, November 19 at 6:00 PM](#). Check the CEAF website periodically to get meeting login information.
- Volunteer. Contact traci@cea-nc.org
- Donate. Send checks to CEAF, P.O. Box 972, Cedar Ridge, CA 95924
• Make an in-person comment at 2020 Nevada County Board of Supervisors meeting (11/10, 11/17, 12/15). The Supervisors will make the ultimate decision about the mine. Go to the kiosk at the Rood Center by 8:55 am, where a staff person will give you instructions on how to comment. Masks are required in the Rood Center. (Details on how to prepare and what to comment on are available from CEAF. Or send an email to president@redbud-cnps.org for info.)
• Though in-person comments are most effective, you can also leave a voicemail that the Board will hear or send a letter. (Details available from CEAF or email president@redbud-cnps.org.)
• Subscribe to CEAF’s newsletter; use the button on their home page: https://www.cea-nc.org/.

Lawsuit against Approved Dorsey Marketplace Project
Current Status: The Dorsey Marketplace Project, which includes a 104,000 sq ft shopping center and 172 apartment units, has been approved by the City of Grass Valley. A lawsuit challenging the legal adequacy of the EIR for the project was filed on August 3. CEAF has joined with Protect Grass Valley on the lawsuit. For more information, see the Facebook page of Protect Grass Valley. See also “Lawsuit seeks new environmental report for Dorsey Marketplace Project,” The Union, August 28, 2020.

Native-Plant-Related Concerns: Redbud submitted comments in opposition to this project because of its impact on unique McNab Cypress plant communities and on rare plants associated with gabbro soils. We share the concerns of Protect Grass Valley and CEAF about the inadequacy of the environmental impact report for the project.

Placer County Conservation Advocacy Updates
Stop a 10,039 Used-Car Parking Lot and Refueling Facility on Vernal Pools and Wetlands
By Leslie Warren, Conservation Advocacy Chair

The Placer County Zoning Administrator approved a 10,039-vehicle parking lot and 190,000 sq ft auto repair and fueling facility on 111 acres of vernal pools and wetland in West Placer in Supervisor Robert Weygandt’s district.

Citizens are appealing to the Board of Supervisors to overturn the Zoning Administrators decision because of the project’s adverse impacts to the environment. The citizens’ appeal is scheduled to go to the Board on November 3. We have asked the Board to postpone the appeal hearing because November 3 is election day, and citizens will be performing their civic duties — voting and getting out the vote — and unavailable to attend the hearing.

How You Can Help
1. Please call Placer County Supervisors at 530-889-4010 or email each Supervisor asking that the appeal NOT be held on election day.

Robert Weygandt rweygand@placer.ca.gov
Bonnie Gore SupervisorGore@placer.ca.gov
Cindy Gustafson cindygustafson@placer.ca.gov
Jim Holmes jholmes@placer.ca.gov

Redbud News, October 2020
2. Provide public comment. On November 3 (or another later date, if the supervisors postpone the appeal date), public comment will be heard at the Board of Supervisors in the Hearing Room on 175 Fulweiller Avenue, Auburn.

- You can offer comments virtually through a Zoom meeting webinar utilizing the “raise hand” function, or by calling 877-853-5247 or 888-788-0099. Check Alliance for Environmental Leadership’s Enviro Events Calendar listing periodically to get meeting login and agenda information; we’ll also aim to do a Redbud Facebook post.
- Another way to provide public comment is to call 530-886-1810 prior to the start of the meeting. You'll receive a call-back and be allowed to comment during public comment.

**What to Say**

Please ask the Supervisors to **uphold the Placer County Tomorrow citizens’ appeal** of the Zoning Administrator’s decision to approve the Carvana project.

- Note that the proposed Carvana uses are inappropriate on sensitive wetlands
- Urge preparation of a **project-level EIR**
- Recommend that Carvana redevelop any of the myriad of existing abandoned auto dealerships, big-box stores and shopping malls rather than breaking new ground and paving over 111 acres of precious, carbon-sequestering vernal pools and wetland that support 14 listed endangered species.
- The wetland is in the Sunset Planning Area. The appeal should be upheld because the Sunset Area Project is in litigation, and Carvana is in conflict with goals of the Sunset Area Plan
- Potential environmental impacts in sensitive habitat require a project level CEQA analysis
- Carvana is in conflict with State Policy that protects vernal pools, which are high-level carbon-sequestration lands.

**Background:**

The Carvana Project would allow construction and operation of an approximately 190,000 sq ft vehicle storage and inspection center with 10,029 used-car parking spaces on vernal pool wetland in the Sunset Planning Area. Redbud Chapter provided letters opposing destruction of this critically endangered vernal pool habitat and provided support to the Alliance for Environmental Leadership’s Citizen Initiated Smart Growth Plan (CISGP), which would have protected vernal pools and created a walkable, high job-generating, mixed-use community. This is also the same area where Placer County promised to attract primary wage-earner jobs through quality high-tech activity. The approved Carvana project satisfies neither AEL’s CISGP nor Placer County’s SAP goals – yet it was approved without a project-level EIR by the Placer County Zoning Administrator on July 16.

In addition to the vehicular storage and inspection center, the Carvana approval authorized the construction and operation of ancillary structures such as a fueling island and car wash facility, parking lots for cars and trucks, stormwater facilities and water quality basins, and landscaped areas.

You can see maps of the area of concern, with aquatic feature types (vernal pools, wetlands, etc.) and impact to land cover. (To enlarge them, zoom in via your browser.)

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**Grow with Redbud: Our Online Native Plant Festival Lives On!**

*By Chrissy Freeman*

We hope you had a chance to attend some of the presentations during our **Grow with Redbud** Virtual Festival of California Native Plants! From mid-August through mid-September, we put on a dizzying array of free online
programs and other events via Zoom and YouTube LiveStream. It was such fun to hear and see our plethora of presenters and the fabulous images they shared. We all learned so much!

Many thanks to all our presenters, to the folks who served as the tech crew and moderators, and to everyone who attended (especially the folks who invited others, asked questions at the end of each program, or otherwise helped make these sessions lively).

**Catch Recordings Online**
We recorded each program, and they’re all available now. Catch up on any you missed by clicking these links:

- **Ecological Forestry, Fuels Modifications, Fire Safety, and Conservation.** Presenter: Chris Paulus
- **Where Redbud and You Fit in The Bold New Vision of CNPS “Everything’s Changing So Fast: An Update”**. Presenter: CNPS Executive Director Dan Gluesenkamp
- **Learning Even More About Your Favorite Local Native Plants Using Calflora.** Presenter: Cynthia Powell.
- **Botanizing Nevada and Placer Counties.** Presenter: Shane Hanofee.
- **Putting Passion into Action: Advocating for What We Love.** Presenter: Leslie Warren, Redbud Conservation Advocacy Co-Chair
- **What Makes Gardening with Natives Special?** Presenter: Chrissy Freeman

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**Pay It Forward with Redbud!**

Think of all that native plants do for you. You can do something for them – make Redbud more effective by taking on a volunteer role! Here are our current openings. (Access the full descriptions on our website.)

- Nevada County Conservation Advocacy Co-Chair
- Program Chair
- Field Trip Chair
- Treasurer
- Volunteer Chair
- Ethnobotany Chair

We always welcome new participants on any of our committees. See list of our committees and committee chairs on our board page.
Updated Garden Guide by Master Gardeners Now Out

The updated 2020 edition of the Master Gardeners of Nevada County Western Sierra Foothills Garden Guide is now available! Although Master Gardeners wanted to launch the updated book with great fanfare, a little quieter approach has been taken because of COVID.

The Garden Guide may be purchased from the following Grass Valley stores and nurseries: A to Z Nursery, Peaceful Valley Farm and Garden Supply, Weiss Brothers Nursery, B&C Nursery. The book is also available at Eisleys Nursery in Auburn. You can also buy it from Redbud member and Master Gardener Chrissy Freeman, in the Chicago Park neighborhood off Hwy 174.

As in previous editions, the 2020 gardening guide provides cultural tips and an abundance of gardening information relevant to the Sierra foothills. New and updated sections on growing native plants, container gardening, composting and vermicomposting have been added. The 2020 edition also provides lists of plants that grow well in our area, as well as expanded information about integrated pest management.

With the updated Western Sierra Foothills Garden Guide as a resource, gardeners in the Sierra foothills can gain confidence and enjoy successful gardening in the challenging conditions unique to our local areas.

Upcoming Redbud Events

Our “Passionate about “Native) Plant” Public Lecture Series – Online

- **November 7, Saturday.** Hannah Kang “The Role of Herbaria in Preserving California’s Unique Botanical Heritage (Or What’s a Native Plant and How Do We Know Them When We See Them?)” Links to Zoom and YouTube are on our website. In her presentation, which will include fascinating images, Hannah will help us understand the ways in which herbaria are more important than ever in this era of climate change, and how they benefit us as lovers of native plants, even if we never consult them directly. (See article about herbaria by Hannah and profile of Hannah and in this newsletter.)

**November 9, Monday.** Growing Native Plants Panel Discussion. We will host a panel of Redbud Chapter members with extensive experience growing our local native plants, ready to answer your questions covering any topic you may want to ask about. Whether you want to know how to grow native plants at home, learn how to take cuttings, decide which native plants would do well in your garden — all horticultural inquiries are welcome! We want your questions to guide the way!

Our panelists will be our Horticulture Chair, Nancy Gilbert, joined by Master Gardener Chrissy Freeman, owner of Nevada County Native Plants Nursery Justin Maciulis, and Redbud home propagator Shane Hanofee. Zoom meeting info is on our website.
November 10-13, Tuesday-Friday. Redbud Bulbs & Books Sale. Sale is 8 a.m. Tuesday through 8 p.m. Friday. Shop and purchase at our new online store. See article at beginning of this newsletter.

What’s Up with No Caps?

You may have noticed that the common names of plant species aren’t capitalized in this issue of Redbud News (except for proper nouns, such as names of people and places). We decided to switch over to this more modern convention to align with contemporary botanists. We hope you’ll agree this requires less adjustment than those switches of plant names from one genus to another occasioned by what genetics is revealing!