

The University of California, Riverside Botanic Gardens UCRDBG Newsletter

Volume 33, Number 4, Winter 2013

INTRODUCING THE MONARCH BUTTERFLY

Article and Photos by Ann Platzer

The Monarch butterfly, *Danaus plexippus*, is a widespread North American insect that ranges from Mexico to as far north as Canada. It has a wing span of about 4 inches and is colored bright orange with black veins and white spots on a black border (photo 1).



Photo 1. Adult male Monarch

The females lay tiny, cream-colored, dome-shaped, eggs on various species of milkweed host plants. Each female may lay up to 500 eggs over a period of three to four weeks. Eggs hatch in



Photo 2. Monarch larvae

about three to four days. The newly emerged caterpillar first eats its egg shell and then becomes a voracious

munching machine, molting (shedding its skin) four times and growing from 1/16 inch to two whole inches over 10-14 days (photo 2); a 25 fold increase in length and 2,000 fold increase in mass! After reaching full size, the caterpillar stops eating and enters what is called a “wandering phase”. During this phase, the caterpillar moves, sometimes long distances from its host plant, to select a place to attach onto with a silken hold fast, upside down in a “J” position. In about a day it molts one last time to become a pupa (photo 3: Monarch pupa with shed larval skin). The pupal stage is the so-called quiescent or quiet period, but quiet it is not. For inside, a major transformation takes place where organs change and wings appear. In just ten to fourteen days, an adult Monarch

emerges with crumpled wings and a fat abdomen full of hemolymph fluid (insect blood). This is a very vulnerable stage for the butterfly since it can't fly and thus is susceptible to predation. Now it must quickly pump fluid from its fat abdomen into the veins of the wings that expand and harden in about one to two hours. And ‘voila’, off flies our magnificent Monarch to live for two to five weeks, unless it is migrating south and then the Monarch survives over winter.

There are many (75-100) species of milkweed, *Asclepias spp*, which can serve as host plants for Monarchs, a number of which are native to California. Milkweeds also serve as important nectar plants for Monarchs as well as for many other species of butterflies. Milkweeds contain cardiac glycosides (heart poisons) that are poisonous to many animals such as livestock, chickens, humans, and most Monarch predators. However, the Monarch larva is insensitive to the chemical effects and the poison is sequestered in its tissues building up concentrations higher than that found in the milkweed plants. Most importantly, the poison remains in the Monarch's body through pupation and emergence to adulthood. Thus, the bright colors and markings of the larva and adult warn expectant

predators to stay away, “I don’t taste good”.

I remember in 1966 that my young Ecology Professor, Dr. Lincoln Brower (whom butterfly enthusiasts may know became a world famous Monarch researcher) showed me a new experiment he was conducting on Monarchs. He discovered that when he fed Monarch adults to Jays the birds vomited and would never touch another Monarch. Naturally, there are some predators that are immune to Monarch poison; two examples are the Black-headed Grosbeak and the Black-eared Mouse. Together these predators consume ten percent of the winter Monarch population at the overwintering roosts in Mexico. You may also refer to my article “Butterfly Enemies” in the UCRBG Newsletter, Spring, 2012.

The vast majority of Monarchs in North America are migratory. They are split into two geographical populations by the Rocky Mountain Range, with eastern Monarchs outnumbering western ones by at least 100 to one.

Early spring signals the Monarchs to start migrating north. However, it takes three-four generations to reach their northern destinations that are limited by host plant availability. It is the **southern migration** that is incredibly spectacular since these Monarchs, which may live 6-9 months, stop only to feed and rest, flying 2,500 miles to reach their overwintering sites. They may travel 60-200 miles per day (9-27 miles per hour depending on wind direction) and fly as high as 10,000 feet. Monarchs fly leisurely, making use of thermal updrafts to soar like hawks and other birds. Like many birds, they use a gliding system, holding their

strong wings extended rigidly and when wind and updrafts lessen they flutter their wings to continue advancing. This is a necessary adaptation during their long, strenuous, migratory flight. How does a Monarch migrate so far and how do they know when to start and which direction to go? First, decreasing daylight signals the approach of winter, so nutritional changes occur in the northern Monarchs.



Photo 3. Monarch Pupa with shed larval skin (white arrow)

Monarchs must migrate to safe overwintering sites that are neither cold enough to kill them or so warm that they waste precious energy through too much activity. The southern mass migration east of the Rocky Mountains from Southern Canada to Central

Mexico is said to be an awesome sight (and on my “to do” wish list). These Monarchs spend winters (about four months) roosting in a few concentrated Oyamel fir forests, *Abies religiosa*, at the 8-12,000 foot level, where there are winter blooming wild flowers for nectar and streams for drinking.

However, our Monarchs west of the Rockies overwinter along California’s coastal groves away from the cold interior (although recently Derham Giuliani found them overwintering in canyons of the Panamint Mountains of Death Valley). There are more than 200 wintering coastal sites from Mendocino County in the north to San Diego in the south. The western Monarchs roost in native Monterey Pine, *Pinus radiata*, Monterey Cypress, *Hesperocyparis (Cupressus) macrocarpa*, and Coastal Redwood, *Sequoia sempervirens*. In addition, they often use introduced Australian *Eucalyptus* that produces precious winter nectar. A few sites to visit from mid October through end of March include: Monarch Grove Sanctuary, Pacific Grove; Point Lobos State Park, near Carmel; Morro Bay State Park; and Pismo State Beach, near San Luis Obispo (photo 4). Witnessing these migrations, and seeing the Monarch roosts, is quite awe-inspiring.



Photo 4. Monarchs roosting at Pismo Beach

These migrants from the fall generation go into reproductive diapause (stop reproducing) to conserve food resources and enhance longevity (their abdomen becomes fat with stored lipid). They use their antennae to calculate seasonal migration relative to the sun’s position, in combination with their eyes and brain. If antennae are damaged they cannot migrate (refer to Grace, 1997 for details). Scientists believe that they rely on the earth’s magnetic field, the position of the sun, and also polarization of the sun’s rays to reach their destination.

Adult Monarchs, like most other butterflies, cannot withstand freezing winter temperatures. To survive,

Monarchs, like many other animals, are threatened due to human activities. Their natural habitat and food resources have been greatly altered by the pressures of urbanization, agriculture, pesticides and deforestation. You may think that Monarchs and other butterflies are only pretty to look at, but they are second only to bees as pollinators and help pollinate our crops. The earth's ecosystem is complex and certain components are fragile. If you break one relationship in the food chain it has the potential to affect the rest of the ecosystem. Do you know that if all the butterflies were

to become extinct the damages to us would be disastrous?

You may not know this, but many common ornamental flowers are useless as a nectar source for butterflies! You can help Monarchs by creating, conserving and protecting milkweed/Monarch habitats. Plant milkweeds as a source of food and nectar and also add other colorful nectar plants. If each one of us just planted one milkweed and another nectar plant, we can help ensure strong, healthy populations of the magnificent Monarch. So, let's plant! Better still, create a

Monarch Waystation (monarchwatch.org/waystation). Seeds of a number of *Asclepias* species are available from the Friends Annual Seedlist for 2013 (see pages 4-6). Happy Butterfly Gardening! 🦋AP

Thanks to Marco Metzger, Gordon Pratt & Edward Platzer for reviewing this article.

Selected references:

Schappert, Scott. 2004. *The Last Monarch Butterfly*, Firefly Books Inc. 113pp.
Grace, Eric, S. 1997. *The World of the Monarch Butterfly*, University of Toronto Press. 114pp.

State of the Gardens

I wish to thank Friends, Volunteers, and Master Gardeners who helped at the Plant Sale, Fiftieth Anniversary Celebration, and Art in the Gardens this Fall.

PLANTS TO SEE: Winter flowering *Buddleja* cultivars in the Butterfly Garden with a host of other winter-flowering species. Endangered native Otay Mesa rose in the Rancho Rose garden and the California desert garden. Endangered native Nevin's barberry from San Timoteo Canyon, Redlands, near the Chancellor's Gate along lilac loop. Several Mediterranean plants flower in winter in the Herb Garden. Several native California plants flower throughout the winter in the desert gardens. Aloes and iceplants on the South African slope. Roses until pruned in January. Scarlet-flowered *Salvia microphylla* from Arizona on the salvia knoll.

SUBTROPICAL FRUIT

ORCHARD - A memorial to

Robert Platt: In September, trees in the orchard, which are used for teaching, were pruned and the irrigation system repaired by

Agricultural Operations, paid for with funds from the Memorial Endowment.

ALDER CANYON: One week before the plant sale, six dead trees in Alder Canyon were removed and their stumps ground down. At present the canyon looks bare. We plan to plant new trees this coming winter with funds from the Memorial Endowment.

Ira J. Condit Ficus Collection: One unique area in the UCR Botanic Gardens is a group of 30 trees of *Ficus* species, which are part of a collection made in the 1920-1960s by Dr. Condit, who was a fig breeder in the Department of Horticultural Science. Dr. Condit also wrote a monograph, *The Fig*, published by *Chronica Botanica* in 1947. A few cold-sensitive species, such as *Ficus sycamorus* from Egypt, have died, but most trees have survived. The collection is badly in need of pruning and general care. The cold-sensitive species may have survived at the South Coast Botanic Garden, 26300 Crenshaw Blvd., Palos Verde Peninsula, CA 90274. A duplicate collection was planted there in the 1960s.

Nancy Beckage: A memorial bench in memory of Professor Nancy

Beckage, from the Department of Entomology, was placed along the ADA wheelchair pathway that climbs out of Alder Canyon towards the Botanic Gardens' garage and greenhouse.

GREENHOUSE REPAIR: The fiberglass roof and siding of the greenhouse was installed in the late 1970s and is in need of replacement. Light intensity inside the structure is very low and plants do not grow well. Funds to replace all or part of the fiberglass sheeting are available from the Department of Botany and Plant Sciences and an anonymous donor.

UCR HERBARIUM NEWS: A recent paper, "Population genetics and ethnobotany of cultivated *Diospyros riojae* Gomez-Pompa (Ebenaceae) an endangered fruit crop (persimmon) from Mexico" by Mitchell Provance, Ignacio Garcia-Ruiz, Caspar Thommes, and Jeffrey Ross-Ibarra. 2013, was published in *Genetic Resources and Crop Evolution* 60:2171-2182.

Kerry Knudsen, Lichen curator in the UCR herbarium, and collaborators have published five papers on lichens and lichenicolous fungi at sites including Yosemite National Park, Oregon, and the Galapagos Islands.

DONATIONS: I wish to thank donors to the following funds:
Botanic Gardens General Fund: James & Susan Dieterich, Brian & Claire Federici, Ray & Marilyn Harris, Dianne Miller, Jeffrey Simons, Barry & Desmyrna Taylor, G. Waines, and James & Mary Curtis Ward.

For the ADA Restrooms: Merial Everett, Monika Ittig, Harold Snyder & William Kleese, Edward Traynor.

Botanic Gardens Endowment: Lewis Cohen

Botanic Gardens Children's Fund: Anonymous (3), ArtPlantae LLC, Carla Bender, Brightie Dunn, James & Gayle Gehrmann, Bruce & Lisa Hale, Barbara Heublien, Inland Region Iris Society, Jennifer Katz, Jewels by Jen, Tracy Khan & Norman Ellstrand, Wilma Printy, Connie & Roger Ransom, S&CG Inc., Karl Stewart, Various Donors, Wild Birds Unlimited, Dianne Williamson.

Botanic Gardens Memorial Fund in Memory of Daisy Mitchell: Elizabeth Dossa, Sharon Gustafsson, G.Waines.

Friends Botanic Gardens Projects Fund: Western Municipal Water District of Riverside County (for the 50th Anniversary Celebration).

Helen & Ortho Camp – Rancho Rose Garden Endowment: Rochelle Campbell

UCR Herbarium Fund in Memory of Oscar Clarke: John Ekhoﬀ

END-OF-YEAR, TAX-

DEDUCTABLE DONATIONS:

Friends who wish to make end-of-year donations to a Botanic Gardens fund, listed above, or to the Butterfly Garden Endowment, may do so by sending a check to the UCR Foundation, or by going online at www.gardens.ucr.edu, and entering the account they wish to support. May the UCR Botanic Gardens' staff wish you all the best for this holiday season. 🌿GW

FRIENDS ANNUAL SEED LIST FOR 2013

The Annual Seed List is just one of the many benefits of being a Friend of UCRBG. Circle the number of any three varieties of seed on the tear-off form, list possible substitutes, and send



Aquilegia eximea, serpentine columbine, USDA Forest Service photo by Brad Kelly

it to Steve Morgan/Annual Seed List, Botanic Gardens, University of California, Riverside, CA 92521-0124. You may also e-mail your choices to ucrbg@ucr.edu but be sure to include substitutes and your postal address. The seed packets include

instructions for growing. Thank you to Theresa Arial, Michael Fugate, Barbara Hayes, Amy Kwiecien, Ann Platzer, Bernice Tank, Katie Shea and Julie Slis who collected, donated and/or processed seeds for the list. Enjoy! 🌿SM

1. *Aquilegia eximea*, "Serpentine columbine," "Van Houtte's columbine" - California native perennial with handsome, much divided, gray green leaves and tall, branching sprays of nodding, orange-red, spurred flowers adored by hummingbirds. In moist areas it spreads readily by seed, sometimes to the point of irritation. Sow any time.

2. *Asclepias curassavica*, "Blood-flower" - A favorite larval host plant for monarch butterflies. Bloodflower is an easy-to-grow, shrubby, four-foot perennial with clusters of red and orange-yellow, crown-shaped flowers throughout warm weather. Sow in spring. *List continued on page 5*



FRIENDS ANNUAL SEED LIST 2013 ORDER FORM

Circle the number of any three varieties of seed on the cut-off form, list possible substitutes, and send it to Steve Morgan/Annual Seed List, Botanic Gardens, University of California, Riverside, CA 92521-0124. Since we must use a special envelope to return your order, DO NOT enclose a self-addressed, stamped envelope. You may also e-mail your choices to ucrbg@ucr.edu but be sure to include substitutes and your postal address.

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Asclepias physocarpa, swan plant, photo by Tau'olunga

3. *Asclepias curassavica* 'Silky Gold', 'Bloodflower' - This is a golden yellow flowered form of a favorite larval host plant for Monarch butterflies. Bloodflower is an easy-to-grow, shrubby, four-foot perennial with clusters of distinctive, crown-shaped flowers

throughout warm weather. Sow in spring.

4. *Asclepias physocarpa*,



"Swan plant" *Asclepias speciosa*, showy milkweed, photo by Matt Lavin
- Summer annual or short-lived,

evergreen perennial with wand-like stems lined with narrow leaves and clusters of waxy white flowers followed by bristly, inflated pods prized for flower arrangements. A favorite larval host plant for Monarch butterflies. Sow in spring.

5. *Asclepias speciosa*, "Showy milkweed" - A hardy, California native perennial growing two to four feet tall with bold, gray, furry leaves and tight clusters of fragrant, pink, star-shaped flowers in summer. Larval host plant for Monarch butterflies. The seeds will need to be planted and kept in the refrigerator for two months to aid germination. Sow in spring.

6. *Asclepias subulata*, "Rush milkweed" - Desert native, shrubby perennial with slender, wand-like,

nearly leafless, waxy-white branches and clusters of curiously shaped, creamy-yellow, waxy flowers in summer; needs good drainage. Larval host plant for Monarch butterflies. Sow in spring.

7. *Bouteloua gracilis*, "Blue gramma grass" - A small, California native, clumping grass with slender, light gray green leaves and distinctive, comb-like flower heads that emerge silvery and turn purple. Winter dormant. Sow in spring.

8. *Cassia leptophylla*, "Gold medalion tree" - This is a fast-growing, medium-sized tree with divided leaves and spectacular clusters of dark yellow flowers in summer, followed by long, dark, woody pods. Sow in spring or early summer.

9. *Chilopsis linearis* (burgundy), "Desert willow" - Dark-flowered form of this California native, fast-growing, small tree or large shrub. Grows to 25 feet tall, with airy appearance; willow-like leaves and trumpet-shaped, burgundy-colored flowers over long spring/summer season. Deciduous. Sow in spring.

10. *Eschscholzia caespitosa*, "Foothill poppy" - Quite different from the regular California poppy, foothill poppy is a smaller plant with spritely, 1-inch, lemon yellow flowers. The foliage is ferny and silvery-green in color. This showy annual is excellent for naturalizing- readily reseeding itself. Sow in fall or early winter.

11. *Gilia capitata*, "Globe gilia" - Globe gilia is a late season native California wildflower that produces globe-shaped clusters of violet-blue flowers with blue pollen. It grows to about 2 feet tall (though it is usually



Eschscholzia caespitosa, foothill poppy, photo by Curtis Clark

smaller) and its relatively shallow roots make it an excellent bulb cover. Globe gilia is especially nice planted closely en masse or planted among other wild flowers. Sow in winter or early spring.

12. *Gladiolus tristis*, "Winter gladiolus" - Perennial from corms; easy relative of hybrid glads with spikes of creamy yellow, funnel-shaped, flowers in winter; exquisitely night fragrant and fine for cutting. Sow in winter or early spring.

13. *Melica imperfecta*, "California melic" - A California native, fine-bladed, perennial grass, that grows to two feet high and is especially effective planted under trees. Can be given limited water in summer to keep it green or it can be allowed to go dormant. Sow in winter or early spring.

14. *Nassella lepida*, "Foothill needle grass" - Drought tolerant, California native grass, forming open clumps of narrow, blue green leaves and tall, long-awned, graceful flower heads that emerge purple, age to silvery gold; can be summer dry. Sow in fall or early winter.

15. *Peritoma (Isomeris) arborea*, "Bladderpod" - California native, drought-tolerant shrub with gray-green leaves, dainty yellow flowers



Gilia capitata, globe gilia, photo by Amada44



Peritoma (Isomeris) arborea, bladderpod,
photo by P.D. Tillman

through warm weather, followed by conspicuous, bright green seed pods. Sow in spring.

16. *Plantago coronopus*, "Buck's horn plantain" - A cool season, annual or biennial plant that forms rosettes of long, lobed leaves and bears interesting, but not showy, spikes of minute flowers. The foliage

is eaten as a salad green.

Sow in fall or early winter.

17. *Salvia spathacea*, "Pitcher sage" - Spreading California native perennial with bold, deliciously aromatic, textured leaves and fat, shish-kabob spikes of large, tubular, rosy-purple flowers; hummingbird favorite. Sow in fall or early winter.

18. *Senna (Cassia) didymobotrya*, "Popcorn cassia" - Popcorn cassia

is always one of our most popular offerings, whether as plants at the sales or as seed in the seedlist. It is a bold, evergreen shrub with divided leaves and candelabra-like spikes of black buds that open to large, yellow flowers over a long winter to spring season. The flower buds and new growth have a distinctive buttered popcorn scent

and these seeds were collected from the Gardens' especially deliciously scented plants. It usually blooms the first year from seed. Sow in spring or summer.



Salvia spathacea, pitcher sage

Volunteer News

by Karen Fleisher

Our volunteers have been busy this fall! Besides the dedicated volunteers who help out in the Gardens on a regular basis with weeding, deadheading, watering and propagation, we have many volunteers who support the Gardens by volunteering for our events. This fall we had three large events, the Garden Festival, the Fall Plant Sale and Keep Our Gardens Clean and Beautiful. About 20 volunteers helped with Garden Fest on October 6, helping with set up and take down, talking with people about plants which would be available at the plant sale, and giving talks.

Volunteers also took part in making the Fall Plant Sale a success on October 26th and 27th. For a month

prior to the plant sale, volunteers, including Master Gardeners, were up at the gardens grooming and labeling plants. On the Thursday and Friday prior to the plant sale, the volunteers loaded plants in trucks and brought them down to be set up. By Friday at noon, all the plants were in place with the signage up and we were ready for Saturday - all done in record time due to the seasoned volunteers who have been doing the set up for the last 4-5 years, including Theresa Wassman, Hillary Brown, Cindy Peterson, and Chad Young, just to name a few. On Saturday and Sunday of the plant sale, volunteers greeted visitors, wrote receipts, helped customers with the selection of plants, made boxes, organized the lunches for other volunteers (thank you Cathy Konyn and Pauline

Pedigo) and just made sure that everything ran smoothly. Many thanks to all our volunteers who contribute so much in support of the Gardens.

We continue to hold monthly volunteer orientations on the second Tuesday of the month, meeting at 9 a.m. at the entrance to the Gardens. We are also looking to add some new members to our team of Visitor Information volunteers who greet visitors on Saturdays and Sundays and introduce them to our beautiful Gardens!

If you are interested in volunteering at the Gardens, please contact me at 951-682-3795 or volunteerucrbg@gmail.com.

 K.F.

Around the Gardens

Fall Plant Sale

October 26-27

Our recent Fall Plant Sale was our most successful in many years. Thank you to all of the many volunteers and shoppers that helped in generating funds for our many projects, as well as the maintenance of the Gardens. On Sunday our children enjoyed a hands-on class taught by Master Gardener Dona Jenkins, entitled 'Creating a Fairy Garden'. Dona is the owner of Garden Moolight, a source for all the materials needed for these special gardens. Twenty four children participated, and there were many proud and smiling faces, and magical gardens going to new homes!

Art in the Gardens

November 10

Our second annual Art in the Gardens on November 10, 2013, drew over 400 visitors to the Gardens. It was a beautiful fall day, a perfect setting for strolling through Alder Canyon and enjoying the beautiful art pieces showcased by the 15 participating California artists, including fused glass, mosaics, jewelry, glass garden art, watercolors, gourds, and even guitars made from colorful cigar boxes! Along with the unique artwork available, delicious bakery treats by Mien Van de Ven and hand-made chocolates by Irma Tandingan De Ley were savored by all.

The proceeds donated by the participants in this event will help fund future Gardens' projects. 🌿 KCF

Keep Our Gardens Clean & Beautiful

November 16

At our 8th Keep Our Gardens Clean and Beautiful event we had 77 student volunteers. In addition there were 15 Master Gardeners present, which led the 9 teams in their assigned areas. UCR student groups were Omega Zeta Chi, Phi Delta Epsilon, National

Note from the Presidents -

Nancy Cullen and Sue Wallace

Dear Friends,

The **Garden Festival** was a wonderful event. It brought in many visitors who did not realize we had a botanic gardens in the city of Riverside. Thanks are due to the hard work of our teams, under the leadership of Margo Chabot and Brightie Dunn. Also, to their credit we have established the Children's Fund to raise money for future projects in the Gardens for children. We can all be proud of the contributions made by volunteers and University staff, and generous vendors all their help with our events throughout the year.

The **Fall Plant Sale** on October 26-27 was another big draw to the Gardens.

We revised our checkout system to comply with University policies. We are still looking for better ways to get our plants home to our Friends and visitors and improve your Gardens experience.

Art in the Gardens was a terrific day. We had hundreds of visitors to see the wonderful offerings from fifteen local artists. Watercolor paintings, jewelry, ceramics, glass birdbaths were among the unique gifts. If you missed it, watch for the next Art in the Gardens in November 2014.

Wishing you Happy Holidays and Happy New Year!

Nancy & Sue

Society of Collegiate Scholars, Sigma Kappa, and a few individual students. The areas worked in were the Rose Garden, Heritage Rose Garden, Northern California Coast, Iris Garden, Mediterranean slope, Subtropical Fruit Orchard, bench sites, Chaparral, and the lilac collection. At the close of the day, many of the

an interest in future volunteer opportunities in the Gardens. The participants all generated visible results in these areas, and they also triggered a perceptible sense of community. Thank you so much to Karen Fleisher, who organized and coordinated this event, and Amy Kwicien, who distributed flyers to campus groups. 🌿 TA

U C Riverside Botanic Gardens

The UCR Botanic Gardens Newsletter is a quarterly journal published by the Friends of the UCR Botanic Gardens, UC Riverside Foundation, 900 University Ave., Riverside, CA 92521, and is one of the benefits of membership. Articles on various aspects of horticulture and its practice, history, or related subjects, especially as they apply to inland Southern California are welcomed. The selection of copy to print is at the discretion of the editors. Send copy to Steve Morgan, Botanic Gardens, University of California, Riverside, CA 92521, call 951.784.6962, e-mail Stephen.morgan@ucr.edu or visit our website at www.gardens.ucr.edu for information.

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Calling All Artists



The UCR Botanic Gardens invites artists to participate in the

Primavera in the Gardens
ART CONTEST

Deadline March 14, 2014

More information can be found at: <http://gardens.ucr.edu/events/art.html>

UPCOMING EVENTS

January 12, Sunday ROSE PRUNING (Rain Date January 19)

February 9, Sunday WINTER LUNCHEON

March 15, Saturday BIRD WALK

April 5 & 6, SPRING PLANT SALE

April 19, Saturday SPRING OUTING to the Theodore Payne Foundation

May 18, Sunday PRIMAVERA