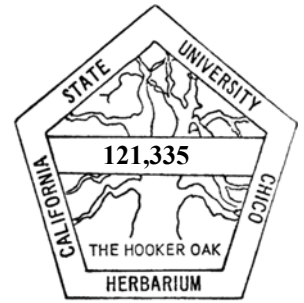




# Friends of the Herbarium

The Chico State Herbarium  
California State University, Chico



Volume 25 Number 1

May 2019

## Newsletter

### Friends of the Herbarium Present the Distinguished Service Award

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At the annual meeting on October 27, 2018, the Friends of the Chico State Herbarium presented Cindy Wiener with their 2018 Distinguished Service Award. This Award is in recognition of Cindy's many years of volunteer service to the Chico State Herbarium. Since 2007, Cindy has been present volunteering in the herbarium almost every Friday. Her many contributions to the Herbarium include the databasing of almost 7800 specimens, the training of most of the new student trainees and other volunteers that have passed through the herbarium, and numerous other curatorial and public relations activities.



Cindy Wiener receives the 2018 Distinguished Service Award from Friends of the Herbarium. From left is Herbarium Curator Lawrence Janeway, Cindy Wiener, and Friends of the Herbarium board member Emily Doe. (Photo by Barbara Castro)

Friends of the Herbarium board member Emily Doe had this to say: "In my experience, Cindy has pretty much always been a regular fixture with the Herbarium. It really wouldn't be the same place without her there! Seven years ago, when I was first introduced to the Herbarium as a student assistant, Cindy played a major role in training and mentoring me. Her patience and love for the legacy of the Herbarium were inspiring and made the Herbarium feel like a second home. Throughout my various levels of involvement, Cindy has always been there to help however needed. She has passed on her skills and knowledge to numerous students, volunteers, and herbarium users. Thank you, Cindy!"



The **Friends of the Chico State Herbarium**, California State University, Chico, was formed to help maintain the high quality of work known to be associated with the Herbarium. The primary purpose of the group is to provide community support for the Herbarium. This includes raising funds for items that are not covered under the University budget, in particular the curator's position. Scientific and academic pursuits as well as community outreach are the focus of the group. The Friends also offer low cost workshops and classes on various botanical topics.

The **Friends of the Herbarium** operates under the auspices of the Research Foundation at the California State University, Chico, and as such enjoys non-profit status and has access to the use of University classrooms and equipment.

Memberships are renewed on January 1 of each year.

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#### *Newsletter*

#### Volume 25 Number 1

The Newsletter is published two times per year by the **Friends of the Herbarium**, California State University, Chico. Subscription is free with membership. Submissions on herbarium-related topics are welcome.

## Friends of the Herbarium Annual Meeting Fall 2018

The Special Presentation at the Annual Meeting of the Friends of the Chico State Herbarium on October 27, 2018 was by Jennifer Jewell on *Leveraging Our Human Impulse to Garden in the Service of Plants*.

Jennifer started the presentation by asking us when we first became aware of plants in our lives and what influence did they have on us. This sparked a very in-depth discussion of the influence of plants in our lives.

*Cultivating Place: conversations on natural history and the human impulse to garden* has been the radio program Jennifer has been involved with on North State Public Radio. Jennifer says that the program ranges from homegrown environmentalism and horticulture, to social justice and spirituality, and the biodiversity of life.

Jennifer is also writing a book, *The Earth in Her Hands: 75 Extraordinary Women Living and Working with Plants*. The mission is to acknowledge the legacy of women who have made important contributions to these areas of expertise and to celebrate the many ways in which women's work in this field has come to the fore in the 21st century. Jennifer is focusing on 75 women who are doing current and innovative work that represent larger issues or shifts in our world in all things horticultural.

Jennifer talked about how there is and can be a direct correlation between your impulse to garden and your deepest concerns in this world. And that the one can and should be the bridge to help with the other. There is a garden for amplifying strengths and bringing them to bear and the people and places and concerns in the world. Jennifer said that every one of her guests on the radio show demonstrates this truth and every woman in her book expands on that.

- by Linnea Hanson



Jennifer Jewell, host of *Cultivating Place: conversations on the natural history and human impulse to garden*. (Photo by John Whittlesey)



## Chico State Herbarium Accessions during 2018

Twenty years ago Vern Oswald started the annual tradition in this newsletter of summarizing all of the collections accessioned into The Chico State Herbarium during the preceding year by county and collector. Here is the summary for 2018. The total number of accessions for 2018 was 1618 specimens.

We continue to owe a HUGE debt of gratitude to our volunteer mounting specialist and plant collector extraordinaire, Lowell Ahart. Aside from a few exchange sheets that came to the herbarium already mounted, and the bryophytes and lichens, which are accessioned into the collection in folded paper packets rather than mounted, Lowell has mounted almost all of the specimens accessioned into the herbarium in 2018. In fact, Lowell has mounted almost all of the specimens accessioned into the herbarium each year since 1995! For 2018, this means that Lowell prepared almost 1500 beautifully mounted specimens that were accessioned into the collection during the year (and many more that haven't been accessioned yet), all as a volunteer! Thank you once again, Lowell, for your continuing contribution of countless hours of invaluable time and service to further the goals of The Chico State Herbarium and northern California botany.

All new incoming specimens are databased before they are filed. The databasing during the past year (and filing) has been done by our wonderful volunteers Cindy Weiner, Nancy Groshong, Mari Moore, and Tara Godinez; and by students Anna Burns, Jess Coronel, Simone Burdick, Toni Rose, and Joe Lomeli.

Also, thanks also to all of the collectors, as shown below, for their time spent collecting, identifying, and making labels for all of the specimens that they contributed to the herbarium. A tremendous amount of time goes into this process and I know that most, if not all, of this time is volunteer time on the part of the collectors.

The following table summarizes the plant specimens accessioned into The Chico State Herbarium during 2018, based on plant group, local collectors, and county.

- by Lawrence Janeway, Herbarium Curator

2018					
GRAND TOTAL:	1618	LOCAL COLLECTORS		TOTAL CALIFORNIA:	1373
		- more than 10 collections -		- top 10 counties -	
Mosses	115	Lowell Ahart	463	Butte	291
Liverworts	3	Lawrence Janeway	334	Nevada	203
Club mosses	1	Rob Schlising	125	Plumas	137
Ferns	2	Barbara Castro	112	Shasta	101
Flowering plants	1497	Robert Banchemo	30	Trinity	96
		David Isle	17	Lassen	93
		Julie Kierstead Nelson	16	Tehama	63
				Yuba	49
				San Bernardino	44
				Los Angeles	43



## What About Those CSU Chico Slime Molds?

By Josephine Guardino and John Dittes

Previous Friends of the Herbarium newsletter articles have highlighted the amazing collection of “Myxomycetes” slime molds housed in the Chico State University Herbarium (April, 2016 and December, 2011). Between two former CSUC biology teachers (the late Dr. Donald Kowalski and Dr. Dwayne Curtis), 10,398 specimens were collected and donated to the CSU Chico Herbarium, 8,912 and 1,486 specimens, respectively. This collection represents 13 families (of 14 known), 54 genera (of 62 known) and ~358 species (of ~900 known), mostly from California (7,639), Washington (1,355) and Oregon (596). This entire collection was databased and georeferenced by our beloved and sorely missed herbarium volunteer, the late Susan Bazell. The collection has been recognized as the most significant in existence for Northern California taxa, and it’s been suggested that still-undescribed species might be included!

But what are “Slime Molds” and why should we care? The answers are surprising. For one, we don’t really know “what they are”! More precisely, their placement in the biological world is uncertain and subject to current study. Once considered a Sub-Kingdom of Fungi, slime molds are now classified as the polyphyletic mycetozoa group in the phylum Amoebozoa, which is placed by some in kingdom Protista, and by others in kingdom Protozoa. Other researchers yet consider them members of an “unranked supergroup” in domain Eukaryota! The CSU Chico collection represents one of three recognized classes of slime mold, the Myxogastria, previously known as Myxomycetes.

Myxogastria are “plasmodial slime molds”. The other



Pretzel slime (*Hemitrichia serpula*)  
(Photo by Dr. Amadez Trnkoczy)

two classes are cellular slime molds and protosteloids. Plasmodial slime molds spend much of their lives as haploid single-celled organisms, each cell alone and actively roving the landscape in



Wolf's Milk (*Lycogala terrestris*)  
(Photo by John Dittes)

search of food items, including bacteria, fungi, fungal spores, yeast, even other slime molds! If conditions are relatively dry, the cells are “myxamoeboid,” flowing and oozing over the substrate like any other amoeba. In moister settings, the cells have defined shape, and equipped with two flagella (some have one) are able to swim as “myxoflagellates” through the watery medium. As conditions change, a cell can switch from one form to the other, and back again. If it gets too dry, the cells secrete a protective wall and enter a dormant cyst stage.

Individual haploid cells can reproduce asexually via simple cell division. When two haploid cells meet however, things can get “a little strange”. The two cells merge and the two nuclei fuse to form a single diploid zygote cell. The nuclei then begin repeated divisions without further cellular division, the cell consumes food items via phagocytosis, and grows, and grows. This is the multinucleate plasmodium stage of the Myxogastria slime-mold life cycle. One large single-celled plasmodium has been measured at 5.5 square-meters in area and another weighed in at 40 pounds! The organism now “flows” over the landscape with singular effort. There is no escape for some from the growing, flowing plasmodial blob as it encapsulates food items and hapless prey with spreading, reaching pseudopods, incorporating “other into self.”

During adverse times, the plasmodium can harden into a sclerotium, entering a resting state. Under conditions of starvation and diminishing habitat suitability, the stressed-out plasmodium ends its search for food, becomes attracted to light and seeks drier ground where it forms a fruiting body, called an aethalium. Within, meiotic divisions produce haploid spores which are finally released into the air to start the cycle over again. The fruiting bodies and spores possess characteristics used in species identification; these are what are mostly housed in the 10,398 little

(Continued on page 6)

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## Friends of the Herbarium Upcoming Workshops

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### Understanding Riparian Ecology from the Perspective of Flowing Water Led by Tom Griggs, Michael Rogner and Stefan Lorenzato

**Wednesday, May 8, 2019 9:00 AM—4:00 PM**

This is a field workshop where participants will examine river flow processes along the middle Sacramento River and implications for riparian vegetation composition and structure

Physical river processes drive riparian ecology. Flooding and flowing water determine how sediment will be moved through the watershed and how it is distributed across the floodplain, with riparian vegetation responding to the different growing conditions provided by the sediment patterns. Flow velocity shapes the plants as they grow and creates the characteristic vegetation structures that we associate with riparian areas. By the end of the workshop Participants will have a greater understanding of:

1. Sediment size classes and how they are distributed across the flood plain.
2. All riparian plant species, both native and invasive, will be identified.
3. How individual wildlife species utilize vegetation structure.
4. The importance of vegetation structure as it affects and directs flood flows across the floodplain.




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### Introduction to Willow Identification Saturday, May 11, 2019 9:00 AM—5:00 PM

**Led by John Bair**

Chico State Herbarium

California is home to over one quarter of the estimated 120 willow species growing in North America. Cottonwoods and willows are the most common riparian hardwood species in California and yet many of us have little idea of how to tell them apart. Species identification is often neglected because willows are thought to frequently hybridize, which is further compounded by only having vegetative material during field visits when we think we need flowers to make a positive identification. The focus will be on the leaf, stem, and other vegetative growth characteristics that are useful in making identification while also emphasizing the regional distributions of the different species.




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### Other Workshops for Summer and Early Fall:

**Bee Identification workshop led by Rob Irwin**

**Maintenance of Native Plant Gardens led by John Whittlesey**



(Continued from *Slime Molds* page 4)

labeled and databased cardboard boxes in the Chico Herbarium collection.

Because of their odd characteristics and with molecular evidence, slime molds are considered one of evolution's "early attempts" at multicellular life, arising a full billion years ago, well before animals, plants or even fungi. They closely followed bacteria out of the primordial soup in the rise to terrestrial life. But what do they do now?

Most often found on rotting wood and leaves they may appear just another "fungal decomposer" Not!. Indeed, they are also known from animal dung. Others are known from soil surfaces and melting snowbanks; some are aquatic. Unlike fungi however, slime molds deliberately travel, actively seeking their food and prey items. They are also consumed, thus providing a crucial link between decomposers, the bacteria and fungi they consume, and organisms higher up in the food web. In addition to other slime molds and some fungi, plasmodial slime molds are known to be fed on by nematodes, small arthropods like mites and springtails, beetles from at least 8 families, and flies from at least 3. Spores of some species have been shown to be spread by birds. A few species cause disease in plants. Slime molds are found on all continents and many are circumboreal. They are most prevalent in temperate regions where they like cool, moist and shady habitats. They are also found in deserts and sub-Arctic regions.

Based on common names given to the most ubiquitous slime molds you would think they were culinary delights. Why the slimy looking organisms inspire appetizing names such as tapioca slime (*Brefeldia maxima*), carnival candy slime (*Arcyria denudata*), chocolate tube slime (*Stemontis splendens*), and pretzel slime (*Hemitrichia serpula*) might be some inside joke. But apparently slime



Scrambled eggs or Dog Vomit? (*Fuligo septica*)  
(Photo by Amadej Trnkoczy)

mold beauty is in the eye of the beholder. Why else would the brightly-colored yellow slime mold *Fuligo septica* be fondly referred to as scrambled eggs by some but dog vomit by others?

If what they are, what they do and what we call them aren't interesting enough, what we're "learning from them" is more mind-bending. If two minds are better than one in figuring out problems, then the many-headed yellow-slime (*Physarum polycephalon*) is better yet. This species is easily grown in controlled lab conditions with oatmeal flakes providing an appealing food source. When this species' plasmodium is placed at a point on a petri dish with oatmeal flakes strategically placed at various locations on the dish, plasmodial margins initially spread uniformly across the dish exploring the micro-environment. As the plasmodium travels across the petri dish, it leaves chemical cues that mark where it's been. Interestingly, it also "remembers" if a particular marked search-path for food was fruitful or not. When nearing an oatmeal flake, the flow of protoplasm in the plasmodium changes. It moves back and forth rhythmically, a motion referred to as shuttle-streaming. Within a brief amount of time through such motion, plasmodial threads form an interconnected network of pathways extending between the different food sources, with each thread marking the shortest, most efficient routes between and among morsels.

This behavior is not only fascinating to those interested in basic biology, amoeboid movement and cell motility, it has also sparked research in other unrelated fields of science. Investigators are studying the behavior of slime molds to glean information with very modern and useful applications. With the attraction of food used as cue, plasmodial slime molds are able to navigate through complex mazes because they "know" where they've been and "remember" successful search pathways.

Taking these observations to the next level, researchers used petri dishes with oatmeal laid out in position of several major cities. The many-headed slime mold formed filamentous networks resembling current major highway systems there. To further test slime mold abilities, salt and light have been used as a bio-mimic for obstacles such as rivers, steep terrain, and even nuclear detonations in "oatmeal-mapped landscapes." Again, and again the slime mold finds the shortest, most efficient pathways. Slime mold analysis have subsequently been used to inform transportation system planning throughout the world!

(Continued on page 11)

## Highlights from Recent Workshops

### Botanical Illustration—February 2, 2019

by Elena Gregg

The Friends hosted a very well attended “Botanical Illustration” class taught by Joan Keeseey at the Chico State Herbarium. Joan, a renowned botanical illustrator, with decades of beautiful, amazing, published illustrations, recently moved to Chico. In the class she provided a wonderful summary of the long and invaluable history of botanical illustration, brought many books and publications for examples, and brought a large assortment of unique plant materials for students to choose from to draw. Using graphite pencils, and special drawing paper, we learned many techniques, all of which concentrated on accurate botanical depiction of fall seeds, pods, and leaves. The herbarium was a perfect location for the class with the wonderful microscope lights on the workbenches, which were fabulous for illuminating the objects selected for drawing. Clearly, it takes a great deal of patience and practice, for botanist or art student, to develop the skills to realistically depict a three-dimensional plant part in one dimension. Quite honestly, this class was truly a terrific place to start with Joan’s exceptional teaching skills and expertise.



*Fremontodendron californicum*,  
Joan Keeseey <https://joankeeseey.com>



Workshop participants displaying their own drawings created during the workshop. (Photo by Elena Gregg)

### Introduction to Bryophytes

February 22- 23, 2019

by Rob Irwin

Ben Carter, director of the Sharsmith Herbarium and Assistant Professor of Biology at San Jose State University, brought attendees closer to appreciating the bryophytes that surround us. Bryophytes include liverworts, mosses and hornworts. Ben arrived with trays of mosses, liverworts, and hornworts that we would likely see in Northern California.

Following introductions, we dove into the bryophyte life cycle, natural history, evolutionary relationships, and morphology. In California we have 150 species of liverworts, 300 hornworts, and about 650 species of mosses. Globally, mosses outnumber the combined number of



Ben Carter and workshop participants for the Bryophyte Identification workshop (Photo by Rob Irwin)

fern and gymnosperm species.

We spent the afternoon walking around campus looking for bryophytes on trees, sidewalks, bare soil, and on masonry. After the wet winter there was no shortage of interesting specimens to be found. Ben explained that mosses occupy microhabitats in a sense much different from vascular plants. For instance, a moss species may find suitable microhabitats on the base of an oak tree in California and on rock inside a shaded canyon in Indonesia. In this sense, geography appears less important than the edaphic characters in a site for bryophytes to establish. Moss spores are very tough by virtue of sporopollenin, an extremely tough polymer, rendering moss spores resistant to environmental stress such as desiccation and

(Continued on page 8)

## Highlights from Recent Workshops Continued

(Bryophyte Workshop Continued from page 7)

UV radiation. This helps spores survive in harsh conditions such as being swept along in the jet stream at high altitude.

On Sunday we worked as a group identifying several bryophytes using the California Moss eFlora ([http://ucjeps.berkeley.edu/CA\\_moss\\_eflora/](http://ucjeps.berkeley.edu/CA_moss_eflora/)). Both stereo mi-

croscopes and compound light microscopes were used to observe external morphological and cellular characteristics useful in keying. I found myself marveling at the intricate beauty of these tiny plants. Watching one species rapidly hydrate from a shriveled mass to a robust plant with reproductive structures in seconds under a scope was shocking to behold. The ability of bryophytes to desiccate and rehydrate is an astounding evolutionary feat and key to their survival.



*Dendroalsia abietina*. Perhaps this will be California's first state moss  
(Photo by Rob Irwin)

Ben proved an excellent instructor and his enthusiasm was infectious. For those workshop attendees new to bryophytes, this workshop was an eye-opener. I, for one, will never again neglect my hand-lens in the rainy season.

putting names to these mysteries. Classroom samples, just handed to you, never seem as emotionally rewarding as naming your own discoveries.

The park walk almost didn't take place. Due to the weather forecast Tom was considering passing on it but at the last second changed his mind. It was a good call, for the class gained a touch of adventure and bonding versus a potential negative mood event. The group got back to the shelter of the classroom having caught only the beginning tip of a torrential rain/hailstorm.

As is often the case the demographics of the participants ranged from students to retirees, usually with assorted botanical backgrounds, and sprinkled with a few folks having more curiosity than biological background. There is always an interest about who traveled the farthest. Carpinteria, near Santa Barbara, won this year. That gentleman said he got up at midnight in order to catch the 9:00 class. Google Maps says that is nearly a 500 mile drive.



A good portion [or most] of the lichen class, in Bidwell Park. Tom Carlberg 4<sup>th</sup> from left. (Photo by Robert Fischer)".

### Identifying Lichens to Genus March 23, 2019

by Robert Fisher

The 10<sup>th</sup> annual FOH Lichen Workshop took place Saturday on March 23<sup>rd</sup>. Once again our educator was Tom Carlberg, out of Arcata. The goal was to develop skills enough to key local macro-lichens to genus. This is tougher than it sounds since one is faced with the massive learning curve of a specialized language and morphology. Three hours into Tom's careful PowerPoint presentation and eyes were beginning to glaze. What broke the overload was a pleasant walk along a lichen-rich Upper Bidwell Park trail. Here the slides and words got a real-world face. Another gift of that outdoor walk was being able to choose your own unknown lichens and then spending the latter half of the day

#### ***Be on the Lookout!!***

We are working with an anonymous donor for an  
***Herbarium Endowment Drive***  
to help support the great things the Herbarium does promoting plant diversity in California



## Monarchs and Milkweed by Dr. Anurag Agrawal

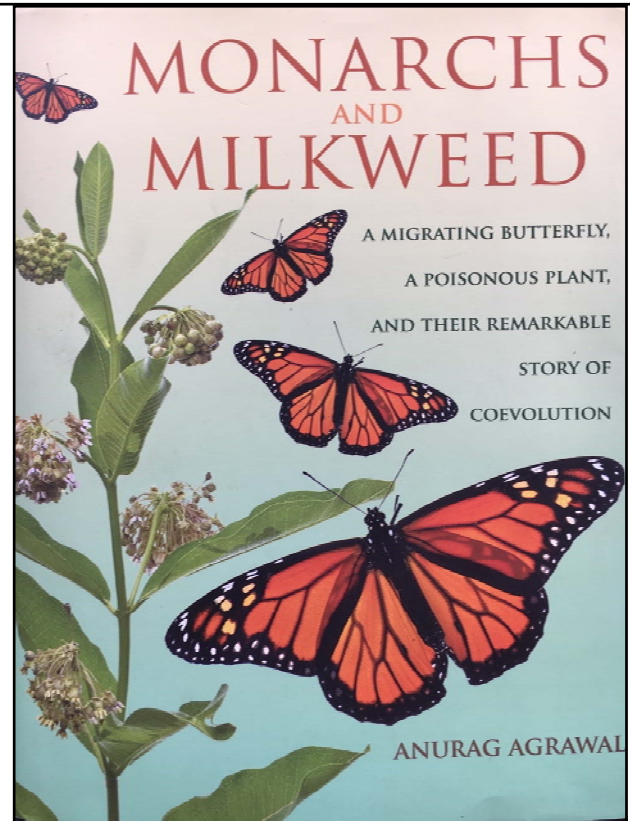
reviewed by John Whittlesey

The monarch butterfly is the most captivating and iconic butterfly in North America. Its size, dramatic colorization, its romantic story of thousand mile migrations ending with spectacular colonies of them draped in trees in Mexico and Southern California makes it our most recognized butterfly. Reading *Monarchs and Milkweeds*, another layer of this remarkable story is revealed. While many people connect that milkweeds are important to the monarchs, Dr. Agrawal describes in depth the 'toxic' relationship between them.

Early on in its evolution the monarch's fate became tied to that of the milkweed – plants in the genus *Asclepias* - when it 'chose' milkweeds as its larval host plant. As we learn in the book, the milkweed does all it can do to discourage this relationship. As the author points out several times, there is apparently no benefit for the milkweed in this relationship, the monarch plays little role in the pollination of the milkweed. While the butterflies can be seen nectaring on the flowers, they are inefficient at transferring pollen, which in milkweed is bundled in packets called pollinia. Honey bees, bumble bees, other large native bees and some wasps are more efficient as milkweed pollinators. To the milkweed, the monarch is a pest, pure and simple.

Dr. Agrawal, A professor in the Dept. of Ecology and Evolutionary Biology and the Dept. of Entomology at Cornell University, spends much of the book describing the moves and countermoves in this coevolutionary relationship. His metaphor, which he uses over and over (and over), is that of an arms race, a battle, an evolutionary war and makes the point that it is not a mutually beneficial relationship – but one where the milkweed is threatened by the monarch and takes drastic measures to insure its survival. "Milkweeds are continually evolving to be better-defended fortresses, and the monarch butterflies are powerful enemies developing strategies to break down the plants' barriers," the author writes.

Cardenolides are the toxic steroid produced by the milkweeds that is central to the milkweed/monarch relationship. The monarch has evolved a number ways to deal with the cardenolides produced by milkweeds, including sequestering them in their tissues, which in turn makes the monarch unpalatable to predators of the caterpillar and adult butterfly. Much of the book is spent on this substance and how the monarchs have evolved to handle it



the best they can.

It was fascinating to read that from day one when the caterpillar hatches from the egg – "it's all out war" according to Agrawal. Most don't make it past the first day. First, they must cut down the trichomes (hairs) to access the leaf tissue. Then, if their approach is wrong, the first bite can inundate them with a river of white, viscous latex, which is poisonous of course. Apparently they need to tread very cautiously that first day. They are able to reduce the flow of latex if they cut the smaller tributary veins first. This gives them a chance, an opening, to begin devouring the leaves.

The survival of the caterpillar is also dependent on the female butterfly laying her eggs on plants that give the larvae the best chance of survival. While it is unclear how monarchs test the leaf for levels of cardenolides, one study showed they laid eggs on plants with intermediate levels – not too high a concentration and not too low. I've watched female monarchs in my garden landing on various milkweeds for a brief time, then moving on to another until finally selecting a plant on which to oviposit.

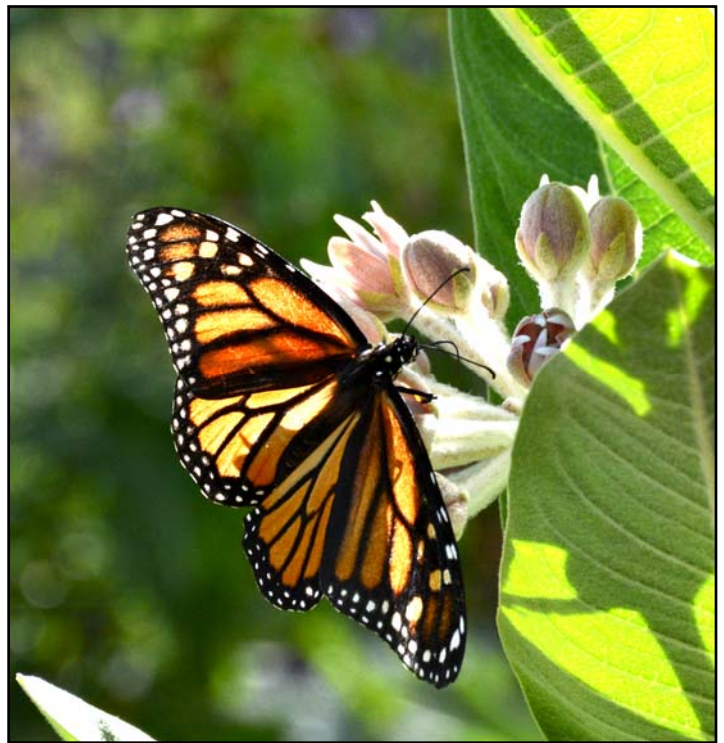
They always seem to choose plants that are not the robust plants in flower, but the recently emerged stems. A recommendation Dr. Agrawal makes is to cut down some of the taller milkweed stems in your garden to encourage

(Continued on page 10)

*(Continued from page 9)*

young growth, which is preferred as larval plants by the female monarch.

Nature is one giant complex relationship – with so many connections that are rarely as evident as the milkweed-monarch relationship. Shining the lens of coevolution on this particular relationship makes us more aware of the complexities in all others. While I would have preferred maybe baseball analogies – hitters adjusting to pitchers – over the author’s military metaphors, that is a minor complaint. He does a superb job of exposing and detailing this fascinating relationship between milkweeds and monarchs.



The life cycle of a monarch - from luminescent egg to multicolor caterpillar to a magical chrysalis, transformed into a majestic butterfly.

Each stage a thing of beauty. And all takes place on milkweed.

(Photos by John Whittlesey)



(Slime Molds Continued from page 6)

Although slime molds clearly lack neurons, studies demonstrate slime molds are modifying their behavior from repeated encounters with adverse conditions. Some refer to this as a form of habituation, the simplest representation of “learning.” Others even consider the phenomenon as “primitive cognition.” But not only do slime molds acquire cellular memory, they are also able to transfer that information from cell to cell. If a nucleus from a pre-conditioned plasmodium is transferred into a previously unconditioned plasmodium, the latter responds as if it has previously interacted with and “learned from” the stimuli.

So, slime molds are obviously smart. Appropriately one institution, Hampshire College, has designated the many-headed slime mold as its first visiting non-human scholar, equipped with its own office and with designated visiting hours. This unconventional scholar “advises” researchers and students under auspice of the Plasmodium Consortium. This collaborative project is a formal think tank developed by philosopher and artist, Jonathon Keats. In this experiment of modern thinking and problem solving, slime mold analysis is used by interdisciplinary teams to enhance and expand the way humans perceive and interact with the universe in which we live. Their innate ability to solve complex mazes, form intricate linkages,

and survive adverse environmental conditions over geologic time have real world implications as we further develop computer, navigational, and communication networks, and modify the environment we inhabit.

We wonder what inspired Dr. Kowalski and Dr. Curtis as they traveled the natural landscape in search of the elusive, colorful, oddly shaped myxogastria which they so caringly collected, identified, and described. Each little box now curated in the Chico State Herbarium has its own story and still-unimagined lessons (the spores are still alive!), all available to researchers and students willing to learn from the brainless slime mold.

Few key sources:

- Microfungi Collections Consortium ([www.microfungi.org](http://www.microfungi.org))
- The Plasmodium Consortium—Hampshire College ([www.sites.hampshire.edu/gallery/the-plasmodium-symposium](http://www.sites.hampshire.edu/gallery/the-plasmodium-symposium))
- Slime mold ([en.wikipedia.org/wiki/Slime\\_mold](http://en.wikipedia.org/wiki/Slime_mold))



Two species of *Myxomycetes* that were featured in earlier Newsletter articles. (Photo by Lawrence Janeway)

## Yes, I Would Like to Join/Renew/Contribute!

- Student.....\$20
- Individual.....\$35
- Sustaining.....\$100
- Lifetime .....\$1,000
- Jim Jokerst Award .....\$\_\_\_\_\_
- Annual Fund .....\$\_\_\_\_\_
- Endowment .....\$\_\_\_\_\_

**Total**      \$\_\_\_\_\_

This is a membership renewal for 2019

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*Please make your check payable to: CSU University Foundation (include membership or donation on the memo line).  
The CSU University Foundation is a 501c(3) non-profit organization.  
Mail to: Chico State Herbarium, c/o Biological Sciences Dept., California State University—Chico, Chico, CA 95929-0515*

## Fall Native Plant Photo Contest—Results

### 8TH ANNUAL CALIFORNIA NATIVE PLANT PHOTO CONTEST

The past fall, the Friends of the Chico State Herbarium hosted our 8<sup>th</sup> annual California Native Plant Photo Contest. We tried a new, online entry format this year and received a wide variety of entries from throughout the state. The diverse entries highlighted some of California's incredible flora and the photos made a beautiful public display at our Annual Meeting in October. With all the excellent photos, it was difficult for the board members to choose a winner, but in the end, Moe Donnelly's photo of *Darlingtonia californica* (bottom left) received the grand prize of a complimentary Friends of the Chico State Herbarium workshop. Gary O'Neill's photo of Seaside Daisy (bottom) and Matt

Berry's photo of a Silver Bush Lupine Forest (bottom right) received Honorable Mention awards. Thanks to all who entered photos and watch for our next California Native Plant Photo Contest this coming fall!  
-by Tim Hanson



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