
Nemophila



Newsletter of the California Botanical Society

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Announcements and Updates

Updates regarding COVID-19

First and foremost, the council of the California Botanical Society hopes that its membership is staying safe and healthy in these difficult times. In response to the pandemic, we'd like to keep you up-to-date on what has changed, and what hasn't, regarding *Madroño*, the Annual Banquet, and plans for the 2021 Graduate Student Symposium.

Some good news is that *Madroño* is continuing to accept submissions for the foreseeable future, and issues are on track. Please feel encouraged to submit to the journal as usual.

As you are likely aware, the 2020 Annual Banquet and Meeting, originally planned for April 4th at the UC Santa Cruz Arboretum, was cancelled in March. Though we are saddened that we did not get to meet up and be merry this year, we are pleased to let you know that we expect to hold both the Graduate Student Symposium and Annual Banquet at the UC Santa Cruz Arboretum in 2021. Keep your eyes peeled for more info in the not-too-distant future!

2020 Science Fair Award Winners

Each year, the California Botanical Society awards prizes to students at local

and regional science fairs for projects related to Western botany. This program was initiated in 2018 and aims to encourage our next generation of botanists.

This year, with judging help from TriBeta Biological Honors Society students at Santa Clara University (Claire Pavelka, Parwana Khazi, and Francesca Navarro), 6 projects received awards.

2020 Synopsys Championship (Santa Clara)

High school

1st place: Tavleen Kaur of Wilcox High School for “Improving crop health and pollinator safety using eco-friendly fertilizers, pesticides, and fire-retardants”

2nd place: Ananya Aswani Kumar of Los Gatos High School for “The effects of biochar treated soil on the ability of *Escherichia coli* to infect plants”

Junior/Middle school

1st place: Benjamin Allen Cha and Brandon Zau of The Harker School for “The Effects of Pondweed on Plant Growth”

2nd place: Maryam Zehra and Katherine Helena Fields of The Harker School for “Purified water vs filtered water vs natural water and its effect on plants”

2020 Santa Cruz County Science and Engineering Fair

Junior/Middle School

1st place: Jonica Wilson qualified independently with a project on “Post-wildfire Recovery of Native vs. Invasive Plants”

Elementary School

1st place: Larkin Steely of Ocean Grove Charter School for “Salt of the Soil: How much Salt can California Plants Take?”



Jonica Wilson collects data for her project on “Post-wildfire Recovery of Native vs. Invasive Plants”

We are currently looking for society members who are interested in judging project at their local fairs. If you are interested in judging or in helping at your county's science fair, you can contact Justen Whittall at jwhittall@scu.edu. Most California counties have science fairs and the Society is currently only sponsoring Santa Clara and Santa Cruz.

Botanical resources, information, and virtual tours during the pandemic

In light of the many closures of botanically interesting attractions, such as museums and herbaria, and the move to conduct classes across disciplines and age levels via virtual means, the California Botanical Society would like to share a few resources relevant to the “virtual” study of botany during the pandemic.

First, the Botanical Society of America has compiled a hefty list of [resources relevant to teaching and learning botany online](#). At that link, you will find articles about free botany courses, info on citizen science, guide to make an accessible virtual classroom, and even a number of YouTube channels featuring botanical content!

Additionally, many California-focused botanical gardens, arboreta, and herbaria have made digital content available so that you can enjoy their collections safely at home. Many also produced virtual tours for National Public Gardens Week (May 8th-17th), available through their social media pages.

Though this is not an exhaustive list, here are a few links to get you started if you need a botanical fix:

- [California Botanical Garden Blog](#)
- [Mildred E. Mathias Botanical Gardens at UCLA - Instagram](#) (virtual tours)
- [Los Angeles County Arboretum and Botanic Garden's](#) "Digital Arboretum"
- [Santa Barbara Botanic Garden's](#) "Garden at Home"
- [University of California Botanical Garden at Berkeley's](#) "Virtual Garden Community"
- Learn about places to see at the [UC Davis Arboretum and Public Garden](#)
- Explore outside with the [Natural History Museums of Los Angeles County](#)

Finally, if you feel ready to visit some of these outdoor botanical wonderlands in person, California state Governor Gavin Newsom recently declared that some outdoor museums and botanical gardens may reopen over the next few weeks. With many native Western American plants in peak flower, this is a great time to support your local Garden and plan a safe visit.

Botanical Feature:

***Madroño* summary by Gabriel Santiago Ortiz Barbosa**

We are excited to share this *Madroño* summary in both English and Spanish.

Authors/Autores:

Adrian J. Das, Nicholas J. Amperssee, Anne H. Pfaff, Nathan L. Stephenson and Tedmond J. Swiecki.

Madroño, 66(4): 164-175. 2019.

<https://doi.org/10.3120/0024-9637-66.4.164>

Summary by/Resumen por:

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Tree mortality in Blue Oak Woodland during extreme drought in Sequoia National Park

Significance Statement

Blue oak has been the focus of conservation efforts of California woodlands. Current work by Das and colleagues shows that blue oak is particularly susceptible to drought which, coupled with a lack of recruitment and increasingly warming climate, might lead to unviable populations in the future. I found this study relevant for current species conservation efforts in California as drought events and increasing temperatures are becoming more prevalent every year.

Das and colleagues assessed blue oak populations inside Sequoia National Park throughout areas of blue oak woodland alliance. This type of woodland is characterized by the presence of blue oak (*Quercus douglasii*), interior live oak (*Q. wislizeni*), California buckeye (*Aesculus californica*), California ash (*Fraxinus*

dipetala), and mountain mahogany (*Cercocarpus betuloides*). Woodland plant species such as the blue oak are a fundamental part of the ecosystem and they currently face multiple threats.

Prior research shows that blue oak seedling populations will not be able to sustain current ones in the future. Some reasons are that smaller trees must compete with other species under shrinking habitats, fire suppressed land, and changes in land use. Also, a warming climate increases drought events and reduces suitable areas where trees can grow and survive.

In their research, Das and his collaborators surveyed 30 plots in Sequoia National Park. Researchers took note of the size and species of the trees to identify any differences in their response to drought. They also compared their results with those obtained before the 2012–2016 drought to determine how it affected tree mortality. For their estimates, researchers also included dead trees and used observations on leaf and twig retention to determine which trees had died more recently.



Figure 1: Blue oaks in a field. Photo: National Park Service

Figura 1. Robles azules en el campo. Fotografía: Servicio de Parques Nacionales.

Interestingly, their results showed that 18% of the recently dead trees were oaks. The number of dead trees is 3–5 times higher in the current assessment when compared with pre-drought datasets. Their observations on foliage and twig retention showed that 14% of all trees had died recently.

Their results confirm there has been recent drought mortality in blue oaks since nearly 20% of them have recently died. Drought affected less other woodland species like the California buckeye and the California ash. It is still important to remember that in prior data sets, blue oaks had smaller pre-drought populations compared to the ones found in this study.

Das and collaborators found that a substantial percentage of blue oak succumbed during drought periods in Sequoia National Park. In the long term, these mortality events can have drastic consequences for the regeneration of the

woodlands. Ecosystems like this one are particularly susceptible to drought and warming climate. Continuous monitoring of adult trees is required to design future conservation and management strategies.

Mortalidad del roble azul durante sequías extremas en bosques del Parque Nacional de las Secuoyas

Declaración de mérito:

El roble azul ha sido el enfoque de esfuerzos de conservación en los bosques de California. El trabajo presentado por Das y colaboradores muestra que el roble azul es particularmente susceptible a la sequía y al aumento de las temperaturas. Además, posee una baja tasa de reclutamiento por lo cual sus poblaciones son susceptibles en el futuro. Este estudio es relevante para guiar las estrategias de conservación de especies de árboles en California debido a que los

períodos de sequía y el aumento de la temperatura se han vuelto cada vez más comunes en los últimos años.

Das y colaboradores realizaron muestreos de roble azul en zonas donde estos árboles se encuentran asociados con otras especies dentro del *Parque Nacional* de las Secuoyas. Este tipo de bosque está caracterizado por la presencia del roble azul (*Quercus douglasii*), el roble del interior (*Aesculus californica*), el falso castaño de California (*Aesculus californica*), el Fresno de California (*Fraxinus dipetala*) y la caoba de montaña (*Cercocarpus betuloides*). Especies como el roble azul son parte fundamental del ecosistema y actualmente enfrentan múltiples amenazas.

Estudios previos muestran que las plántulas de roble azul no tienen la capacidad para mantener la continuidad de las poblaciones actuales en el futuro. Esto se debe a que los árboles deben competir con otras especies en hábitats que se reducen día a día o a que se encuentran en áreas quemadas y cuyas tierras han sido modificadas para otros usos. Por otro lado, el cambio climático ha aumentado los eventos de sequía y ha reducido las áreas adecuadas para que estos árboles sobrevivan.

En su investigación, Das y sus colaboradores muestrearon los árboles dentro de 30 parcelas dentro del *Parque Nacional* de las Secuoyas. Los investigadores recopilaron información sobre la identidad taxonómica de estos árboles, así como su tamaño con el objetivo de identificar si existían diferencias en su respuesta a la reciente sequía. Asimismo, los resultados obtenidos fueron comparados con los disponibles en bases de datos previas a la sequía (2012–2016) para

poder determinar si la tasa de mortalidad de los árboles había resultado afectada. Para su análisis, los investigadores incluyeron árboles muertos, así como observaciones de retención de hojas y ramas para identificar qué árboles habían muerto más recientemente.

Los resultados muestran que el 18% de los árboles recientemente fallecidos eran robles. Esto significa que el número de árboles muertos es 3–5 veces mayor que lo reportado en muestreos previos a los eventos de sequía. Sus observaciones de retención de hojas y ramas muestran que el 14% de todas las especies de árboles murió recientemente.

Sus resultados también confirmaron la existencia de altas tasas de mortalidad en el roble azul; alrededor del 20% de los individuos muestreados murieron recientemente. Por otro lado, se determinó que la sequía ha afectado en menor proporción a otras especies de árboles, como el Fresno de California y el falso castaño de California. Es importante recordar que, en bases de datos previas a la sequía, los robles azules tenían poblaciones más pequeñas comparadas con las que se muestrearon en el presente estudio.

Das y colaboradores encontraron que un porcentaje substancial de roble azul pereció durante los eventos de sequía en el *Parque Nacional* de las Secuoyas. A largo plazo, estos eventos de mortalidad pueden tener consecuencias drásticas para la regeneración de estos bosques. Ecosistemas como éste son particularmente susceptibles a la sequía y al cambio climático. El monitoreo continuo de árboles adultos es necesario para diseñar estrategias de manejo y conservación a futuro.

Sign up for the Botany Ambassador Program!



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Connect with us: lvill017@ucr.edu

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