

## GETTING TO KNOW GRASSLAND RESEARCHERS

by Emily Allen, CNGA Board Member

### Brianne Palmer

Brianne Palmer is in her second year as a PhD candidate in a joint doctoral program with San Diego State University and University of California Davis. She has been involved in grasslands research for three years.

#### What is your study system?

I study biological soil crusts (biocrusts) in California grasslands. My current plots are on San Clemente Island, though I am also looking at potential sites in central and northern California grasslands. When I moved to California in August 2017, with the intention of studying biocrusts, I didn't know they were even in grasslands. I had spent the previous few months in the Colorado Plateau region as a botany intern and didn't think about biocrusts existing outside deserts. When my advisor suggested a project studying biocrusts on an island and in a relatively understudied biocrust habitat, I was all in. The biocrusts on San Clemente are all over and so diverse! Unlike in the Colorado Plateau, these crusts are low statured and very cryptic. But once I am down on my hands and knees looking at them, there are so many different types: the black cyanobacteria, multicolored lichens, and bright green algae and moss. I think biocrusts appeal to me because I have a background in plant ecology and a growing interest in plant-soil interactions and biocrusts are the transition zone between plants and soils. The more I study biocrusts, the more I see them all around me. I found some outside my apartment while walking the dog and in a serpentine soil grassland. Once I notice them, it's hard not to make everything around me a potential study system, I just don't have that kind of time.

#### What are your primary research goals?

Broadly, I am interested in understanding how biocrusts alter the biogeochemistry, and consequently the plant communities, in varying successional states. I am primarily assessing nitrogen fixation and photosynthetic activity as well as overall biocrust cover. In a series of greenhouse experiments I am also testing how biocrusts inhibit successful native and non-native grass germination and how they alter the germination timing. One of the key aspects of my research that sets it apart from a lot of other biocrusts studies is the addition of fire response. An important aspect of California grasslands is the changing fire regime and we don't fully understand how biocrusts respond to fire. There have been prescribed burns for United States Geological Survey (USGS) research plots and naturally ignited fires on San Clemente island which makes it a good site to track biocrust succession after fire. I am using metagenomic techniques to look at the microbial community composition difference between burned and unburned plots and infer the ecosystem function.

#### Who is your audience?

In addition to the general research community who may be interested in the ecosystem function of biocrusts, I would also like to reach out



The photo was taken by me on in the early morning on San Clemente Island in April, 2017 during my first trip measuring biocrust cover at all my plots.

to land managers and agencies to share the importance of biocrusts in ecosystem assessments. I think biocrusts should be included in restoration plans and could possibly be used to aid restoration goals. I hope to share my findings with those doing restoration and fire management and hope biocrust management will make a notable difference in restoration ecology.

#### Who has inspired you, including your mentors?

I wouldn't be where I am today if it wasn't for notable mentors in my undergraduate, Utah State University, and joining the College of Natural Resources there was the best decision for my career. I gained valuable research experience working with Dr. Karen Mock for three years, studying aspen trees in northern Utah. That project got me out in the field and in the lab. Presenting that work allowed me to travel across the country and meet other scientists and reinforced my desire to go to graduate school. But the most influential mentor of my undergraduate is Dr. Fee Busby. He convinced me to join the plant identification team and without that I wouldn't be able to identify a single grass out there. He showed me that rangeland research can be fun and informative and can truly make a difference, all while being a friend. I don't know where I would be without his mentorship, guidance, and recommendations. In my year off before graduate school I worked as a rare plant botanist in Utah with a team of people so passionate about their job that it was fun to hike through record heat and monsoon storms to try to find a plant that may or may not exist anymore. I try to go into my work now with that same endurance and understanding that when working with cryptic organisms, failure is the default and that's okay.

My lab at San Diego State is also inspiring. I feel supported by Dr. David Lipson and the other students in our lab, and all the biology grad students in general! It's a great group of people to work with. I will be working at University of California Davis in Dr. Valerie Eviner's lab for the next year, and I expect I will find yet another supportive group of faculty and students.

*continued next page*

## Brianne Palmer *continued*

### **How has or will your research align with the mission of CNGA “to promote, preserve, and restore the diversity of California’s native grasses and grassland ecosystems through education, advocacy, research, and stewardship”?**

With any luck, my research should improve our understanding of community interactions in grasslands. I presented my preliminary data at the California Society for Ecological Restoration Conference in May earlier this year and will be presenting my results at more conferences in the coming year with soil scientists, rangeland managers, and other professionals in the field. I will keep talking about how cool biocrusts are to anyone that will listen. The more people know about these complex communities, the more resources we can spend conserving our grasslands.

### **Why do you love grasslands?**

I didn’t always love grasslands. Growing up in Colorado I associated grasslands with long and boring drives through the eastern half of the state. It wasn’t until I really got into botany that I realized the diversity and complexity of grasslands. I love that despite how widespread they are you can find something new anywhere you go. I love being able to get out of my car and just start walking into a grassland and where some people might just see a field of grass, there are so many cool species hiding in there just waiting to be appreciated. And there is something about the smell of grasslands after a good rain, when the grasses green up and the soil is moist, it just feels peaceful. On San Clemente, the island foxes hunt in the grasslands. I love just sitting on the ground and watching the foxes scurry around. Sometimes I miss the shade of the trees, but with a wide-brimmed hat and sunscreen, I’m ready to spend my day with the graminoids.



### **California Native Grasslands Association**

PO Box 485  
Davis, CA 95617-0485

(530) 902-6009

[www.cnga.org](http://www.cnga.org)

*The mission of the California Native Grasslands Association is to promote, preserve, and restore the diversity of California's native grasses and grassland ecosystems through education, advocacy, research, and stewardship.*