Texas Gulf Coast Fern Society

October 2022 **Vol. 24 No. 10**

http://www.tgcfernsoc.org

Our meeting this month will be "blended" by meeting in-person at the Judson Robinson, Jr. Community Center (2020 Hermann Dr., Houston, 77004) and/or via *GoToMeeting* – member's choice.

A message from our President:

Howdy everyone!

I believe we all enjoyed the presentation last month on Lady Ferns aka *Athyrium filix-femina*. I had no idea there were so many species and cultivars we could grow in the Houston area. It was fun to see more members at the meeting. Still lots to get caught up on.

I have asked Cecil Strange to chair the nomination committee and Diane Hudnull and Jaqueline Smith were chosen to assist him. This is for officers for the 2023 year of our fern society. **NB**: **we will be voting on the slate of officers the nomination committee will present to the membership at this meeting**. Just as a reminder, our club is a group of people with similar interests in ferns. In order to continue functioning and achieving our mutual goals it's fundamental that everyone who can possibly perform a particular role step up.

We had great food as we normally do, and the raffle too, was well received. Thank you everyone that participated in either bringing food or a plant or just purchasing a ticket to win a new plant.

Many thanks for all those folks that do so much each year.

Pat

Sunday's Topic:
The Fern Frond and How it Works
By: Dr. Christopher P. Krieg

Have you ever wondered what's in a leaf? What does it do for the plant? How does it work? Does it do different things for the pant at different ages of the plant? How does it help the plant to grow? We will learn all about the answers to these and many more questions as we explore the fern frond and all its many functions.

Bio of Dr. Krieg, (In his own words)

Dr. Christopher P. Krieg (University of Wisconsin-Madison, Madison, Wisconsin, USA) is a plant ecophysiologist who uses interdisciplinary methods to uncover the ecological and evolutionary processes that generate diversity in plant form and trait function, and how physiological diversity shapes plant ecology and distributions. His talk will be about the evolutionary, ecological, and physiological factors that drive fern frond longevity and lifespan.

In Memoria:
Linda Gay

We lost an Icon in the Houston horticulture community and a member of the TGCFS, Linda Gay. I met Linda back around 2000 when the fern society started meeting at Mercer Arboretum and she was the Director there. She loved ferns and took our society in with a personal notice. We took several walks around the gardens as she shared the then young group of ferns that were planted around the pre-historic section of the gardens. With it's Texas natives and tree ferns, down to the fern-pressed, fossil-looking walkways, I can remember being in such awe. Over the years we stayed friends and she spoke to the fern society on several occasions. She was always willing to share her knowledge with anyone that asked for it. She had a broad horticultural back ground and could ID just about any plant. She helped me with some that had been my mom's.

She battled pancreatic cancer for five years before it got the best of her. She left behind her husband and their son, plus a city, state, and country of others. She was from

Louisiana and never forgot her roots as she became a Texan. Linda loved people, teaching and most of all she never met a plant she did not like. Ferns and Bamboos where some of her favorites.

She will be missed.

Darla

Dues!

Special announcement by Beth Ayers:

We are requesting payment of 2023 dues. Dues should be paid by January 1, 2023. I am happy to report that 49% of our membership has paid their 2023 dues as of 10.5.22.

Your dues may be paid in person at a meeting or sent by mail to me: Beth Ayer, 5815 Portal Dr., Houston, TX 77096.

Checks should be payable to: **Texas Gulf Coast Fern Society (TGCFS)**.

If you have any questions about the status of you dues please contact me at either: beth.ayer@yahoo.com or 713.729.0994 (landline; you may leave a voice mail message).

The American Fern Society (AFS)

The American Fern Society is over 120 years old. With over 900 members worldwide, it is one of the largest international fern clubs in the world. It was established in 1893 with the objective of fostering interest in ferns and fern allies. It exchanges information and specimens between members via their publications and spore exchange.

AFS non-professional membership ($20) includes access to the Spore Exchange and subscription to the Fiddlehead Forum.

Professional membership ($40) includes the benefits above plus access to the American Fern Journal.

Please note that donations to the AFS are not tax deductible.

To find out more about the Society and/or join, visit https://www.amerfernsoc.org/

2022 Officers and Committees:

President:	Patrick Hudnall
Vice President:	Lisa George
Secretary:	Ceil Dow
Treasurer:	Beth Ayer
Board Members-at-Large:	Darla Harris (Past Pres), Jacqueline Smith Malcolm McCorquodale
Education Chair:	Darla Harris
Hospitality Chair:	Larry Rucker
Library:	Betsy and Fred Robison
Membership Chair:	Ruby Adams
Newsletter:	Paul Geiger
Spore Exchange:	Patrick Hudnall
Ways and Means:	Larry Rucker
Raffle, Store, etc.	Rick Dow
Web Master:	Malcolm McCorquodale
Welcoming at Door:	Faye Stansberry

3rd Quarter 2022 Treasurer's Report

Income:

Dues:	$210.00
Raffle:	$192.00
Donations:	$10.00
Interest:	$0.36

Expenses:

Program Exp.	$385.92
Balance on 12-31-2021:	$15,798.79
Balance on 09-30-2022:	$16,179.18
Net gain for 3rd Quarter:	$25.44
Net gain for 2022:	380.39

Respectfully submitted, Beth Ayer, Treasurer

Minutes of Blended Meeting via "GoToMeeting" and In-person

September 18, 2022

Texas Gulf Coast Fern Society

Meeting was held at 2:00pm at the Justin Robinson Community Center in Hermann Park. Members unable to attend the in-person meeting could still participate on the "GoToMeeting" app.

Called the meeting to order at 2:05 pm. By Patrick Hudnall

Approximately 19 members present in person and 7 present online.

Cecil Strange will chair the Chairman of the Nominating Committee. Diane Hudnall & Jacqueline Smith have volunteered to help in that committee.

Patrick Hudnall noted that he will not be president of the TGCFS meeting next year.

TGCFS dues are now being collected for the 2023 calendar year.

Amazon Smile has the GCFS on its list of charities. If you sign up for the GCFS on Amazon Smile, a small portion will be donated to GCFS and the society will get a check from Amazon once a year.

Presentation: "Re-evaluating the Lady Fern (*Athyrium filix-femina*) species complex in North America" by Bertrand Black.

Betrand Black received a B.S. in Botany and Biology with an emphasis on ecology and biodiversity at Cal Poly Humboldt. He is currently a PhD Student at University of Vermont in the Plant Biology Dept. His current research interests are focused on phylogenetics, biodiversity, and biogeography. He found the best way to address all of these

topics simultaneously was to study a species complex such as the lady ferns (*Athyrium filix-femina*). The study would allow him to apply the most recent analytical tools to untangle the cryptic biodiversity hidden in this captivating group of non-flowering plants.

Lady ferns (*Athyrium filix-femina*) are one of the most common and widespread ferns in the temperate regions of the northern hemisphere, and are familiar to many New England naturalists. However, these plants have a controversial and complicated history among botanists. Even today, depending on your location or who you ask, this fern has been given many different names and is recognized at multiple different taxonomic levels (species, subspecies, variety, etc). In this presentation, he will investigate the convoluted history of this this fern and examine the most recent scientific methods now being applied to make sense of them.

He took part in the study that described a new species of *Lellingeria* from the cloud forests of Panama. Found in Cerro Azul by Jerry Harrison. The information was published in American Fern Journal in 2021 and the fern was featured on the cover of the publication. He helped in the phylogenic tree, taxonomic description, creation of a distribution map and helped to revise the key to Lellingeria genus of Costa Rica.

The definition of a species complex is when two or more cryptic species are hidden under one name.
The Lady Fern is a member of one of the largest fern families, *Athyriaceae*. Within this family are 3 genus and 650 species (more species are found every year). Members of this family are characterized by being mostly terrestrial, exhibiting linear sori (or long, back to back sori), and having two vascular bundles. The three genera are *Deparia* with 70 species and 75% of these are found in Asia, *Athyriids* with 250 species & 80% found in Asia and finally *Diplazium* with 350 species & 70% species are found in Asia. In the Americas, *Diplazium* - 30% are found in mainly in Central & South America with approximately 105 species found there, *Athriids* - only 3% are found in Central & South America with 8 species found there and *Deparia* is less than 1% with only one species found in Vermont.

Anthyrium morphology - They are found in a terrestrial habit. They have swollen trophopods at the base of the petiole which is used to store starch with black to light brown scales. A continuous groove from costa to rachis and rachis to costa is displayed without interruption. The defining characteristic is a "J" shaped sori.

The *Athyrium* range is 92.7% in Eurasia, 3.2% in the Americas and 4.1% in other parts of the world. Carl Linnaeus was the first to describe *Athyrium filix femina* (syn. *Polypodium filix femina*) from a drawing made by Plukenet in 1692. As explorers found more ferns throughout their exploration and colonization, they brought back samples of the different ferns. Some were wrongly classified into the *Polypodium* family. Eventually, in current day, molecular phylogenetics have helped to distinguish the differences of these ferns.

Bertrand Black works in a herbarium at the University of Vermont where he was able to view different herbarium samples of ferns from North, Central & South America and Eurasia. He captured certain parts of the genome that he knows is important. This technique is called "target capture sequencing". They take a herbarium specimen and extract its DNA. He was able to extract DNA from a specimen dating back to 1881. He then created the "Targeted Nuclear Probe" which means they are able to find the exact place in the genome that they want to sequence and make copies of those particular places. In this way, you can then compare the same place in the genome across different herbarium specimens. Then you do the actual sequencing, clean them up and align them so that they are comparing the same gene across all of them. Then they build their trees. There were 102 samples and recovered most of the genes they were searching for. The age of the DNA was a range from 1881 to current day.

Preliminary Findings – there are 6 major clades of *Athyrium filix-femina* in North America. Then there is a really large clade found from Central Mexico to Buenos Aires across the temperate regions of this area in higher elevations. These Lady Fern plants form a monophyletic group. It looks like North America Lady Ferns were the origins for the European Lady Ferns and Siberian Lady Ferns.

Further research was needed to see if all of these ferns that seem to be related, grow in the same place. They used statistics and biological sampling, and took the public data from World Clim Bioclimatic Data and the Unified North American Soil Map. They took all the variations and collapsed it into principal components. Each one of these principal components is a representation of the variation in the data.

In Texas, we have *Athyrium asplenioides* growing here. The range is from East Texas to mid-Atlantic as far north as Connecticut. The petiole is generally much longer. The blade shape is more deltoid than its sister taxa. It also has glandular hairs. Unlike European *Athyrium*, it has short creeping rhizome and brown reticulate spores.

Sister to *Athyrium asplenioides* is *A. bourgaei* clade. They are only found at high elevations in Mexico and Central America. Characterized by narrow lanceolate blade with reduced basal pinnae. They share the glandular hairs, creeping rhizome and brown reticulate spores. Unlike their sister group, their spores are much larger.

The European *Athyrium filix-femina* clade has a much shorter petiole. These are often found in the commercial nursery trade. The basal pinnae are reduced to a stub. These are very different from the North American ferns. They also

have the absence of glandular hair. These ferns have yellow and papillate spores and not the brown and reticulate spores.

In north-eastern North America, the *Athyrium angustum* clade is found. These plants are found in North Dakota and Colorado. They share their most common ancestor to New England. These plants are characterized by ellipsoid laminae and unlike their European sister group, their basal pinnae are not so reduced. They do not have short petioles, exhibit fewer pinnae pairs and has short creeping rhizomes. It often has a characteristic red stem which gives it the common name, "Lady in Red".

The *Athyrium californicum* clade is restricted to high elevation of California and the deserts of the American Southwest and Mexico. The pinnae are extremely reduced. Short creeping rhizome and often tiny in diameter. Unlike its two sister groups, it has brown reticulate spores. *Athyrium cyclosorum* clade are found in temperate rain forests of the Pacific Northwest from California to Alaska. A single plant can grow to 2 meters in length. They have a leathery texture which is not found in other members of this group. They have round or u shaped sori and yellow spores. They would like to investigate the hybrid range and look for unique characteristics. He would also like to explore the fern varieties in South America and the Caribbean.

Questions & Answers

Question: What do you want to do after PhD graduation?
Answer: I'm a four year PhD student so I've been fortunate to work in the university's herbarium. A dream job would be working in a research collection in a museum or at the Smithsonian. He would like to work in a post-doctoral program and apply what he has learned to different organisms. Perhaps work on non-flowering plants but hopefully not flowering plants.
Question: What is cryptic diversity mean?
Answer: Biodiversity composes so many different things like the number of species or the abundance of species. Cryptic diversity means not straight forward or hidden. It is what you see when you look at the plant: the sample size, the observation of its morphology and also the geography - where does it grow? Does one grow on top of the mountain or does it grow at the bottom of the mountain? Molecular phylogenetics show where they share common genetics. Take complex organisms and tease them apart. (Cryptic diversity is commonly defined as the occurrence of distinct evolutionary lineages that are otherwise morphologically indistinguishable within a nominal species.)
Question: So we amateurs should start calling them their new specific species name?
Answer: I call them *Athyrium californicum* clade or *A. cyclosorum* clade which is a catch-all term that includes all of the different species. At least until the new plant species name is published.

Note: He was astonished to see the Athyrium with such a red stem found so far south in East Texas. It was found in the Big Thicket near Cold Springs, Texas. He would like a sample sent to him so he could include it in the next round of sequencing.

Respectfully submitted by Ceil Dow.

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Signing up is easy!

Here's how to sign up and shop at AmazonSmile:

1. Visit smile.amazon.com
2. Sign in with your Amazon username and password.
3. Then either go to "Your Account", and under the box "Shopping programs and rentals", select the option to "Change Your Charity"; or you can also hover your mouse over the small arrow next to the charity you are currently supporting and click Change.
4. Type Texas Gulf Coast Fern Society into the search and the click select.
5. Start shopping! You can add a bookmark for smile.amazon.com to make it even easier to return and start your shopping at AmazonSmile.

On Custom Potting Mixes

Submitted by Patrick Hudnall

One of the first lessons I learned upon joining the Fern Society was the importance of using a good and proper potting mix. In the beginning I skimped on potting mix and paid a higher price in failures. The mix had apparently been spiked with chemical fertilizer and promptly burned the roots of my new tender ferns. I also realized that leaving a 1-gallon black plastic pot where the afternoon sun would shine on it for hours literally cooked the roots as well. I felt like a real dummy. In high school, back in San Diego, my brother and I would mix our own potting mix because we couldn't find a quality mix at a low price. We'd buy a bale of ground Peat Moss, a sack of play sand, a sack of "Oak Leaf Mold" (composted live oak leaves) and a bag of redwood shavings. We'd dump the bags on the patio, mix it with shovels and put it back in the bags. It worked very well. Fast forward to 21st century. I've found, through reading the contents (of only minor help) and actually looking closely at the mix, that Miracle Grow® (in the yellow bag) is a pretty good **general** mix. I have also found it to have a moderate degree of variability in contents. I don't see the need to pay a couple buck more (for the blue

bag) with an added product to moderate water and subtract sphagnum peat moss. Note: while visiting Darla I found she uses the same product, but in a smaller bag. Sometimes the smaller bag is available at big box stores at the same or lower price /cubic foot. Having a much smaller fern and plant collection I'm able to modify this general potting mix to suit the needs of the specific plants. Many of my plants are "impulse buys", that is, I stumble across an odd plant and buy it. With smart phones I will sometimes google the plant to see if I can even grow it in our area. You might be surprised what nurseries will sell that are quite difficult to grow here. Most nurseries, with the exception of John Fairy Garden, Mercer, Fern Plantation and Zone 9, I have found all others to offer odd plants mislabeled. Anyway, when you find out what you've got, look under "Cultivation", you *should* find what type of soil substrate they grow in, either under cultivation or in habitat. This is where I have failed in the past. You'll find info on humidity range, sunlight requirements, moisture requirements and… requirements for substrate, or potting mix. Being fortunate to have Southwest Fertilizer not far away, they have all the right stuff for any kind of exotic or common soil mix. They will carry just about anything you could desire for your custom mix. Also, they have the stuff usually in different sizes. I keep on hand the Miracle Grow potting mix, a large sack of perlite, and sacks of play sand and volcanic sand. A large bale of milled Peat Moss. Also, Agricultural Limestone, Super Phosphate, Ironite, dried molasses and dried kelp. Etc.

It's fun to try different potting or planting mixes and sharing that information with fellow members.