



April 2021

Vol. 23 No. 4

<http://www.tgcfernsoc.org>

Due to COVID-19 restrictions our meeting this month will be another “virtual” one.

A message from our President:

Hi Everyone,

Now that the freeze is over we have had some time to check our ferns and see which have done well and which we are still waiting on. I know for me it has been fun checking one day and find nothing, and the next day fronds have popped up. So far, the Korean Rock fern and the East Indian Holly surprised me the most. I did not think they would go down at 10⁰F but they browned out on the tops, and started pushing all new growth within three weeks. The Autumn fern surprised me that it did not go down at all with this temperature. Some of the maidenhair ferns are back but others have not done anything yet, so we will continue to wait and see. The clear winner for me was the sellaginella gold tip; it road this out like this happens every day.

Yes, I know this note is very late. My hard drive was on its last leg so I took my computer in and had a new one built and it took much longer than they said it would. The good news is: I’m back up and running and only need to figure out how to move all my photos and documents over to the new one. And yes, he said he would do this, but I’m not seeing it even in the file he marked “old stuff”. So going forward we should be able to send out the newsletter on time again.

Don’t let the title of this month's meeting scare you off. If you have ever wondered how plants got from one point to another point around the world, this will help explain how as well as lot of other things that are very interesting in the way of ferns and where the live. I have heard part of this talk before, it was a condensed 15 minute talk, but was enough that I thought we would all love to hear the 45 minute one. I’m excited.

Well this is short so poor Paul can try to email you before the meeting is over. I’ll send out the meeting notice on Friday, it might beat this.

Talk care everyone!! And stay safe! See you Sunday.

Darla



**In Memoria
Jean Richardson**



We have lost a dear friend and member of our Fern Society, Jean (Jeanie) Richardson. For those that started with the society back in 1998 you would know Jeanie was one of the founding members or shortly thereafter. She would be the second Secretary for our society and would remain an active member of our group up until about 2007. Jeanie ended up bring her husband Ted into the society a couple years after she started. Together they helped with our sales at the George R Brown, selling, setting up, and just being a big support to the group. They hosted several of your parties throughout the years and were always attending the field trips and just great people. Jeanie's health starting taking some unpredictable turns and they decided they wanted to enjoy life now that they were both retired so they started being gone a lot and missed meetings, and then missed parties and field trips, but they enjoyed each other. That is what life is about! Jeanie was one of those sweet,

never had an unkind word to say about anyone type people that you really wished you knew more of. She was old school and if she said she would do something she did. Even though her illnesses she never loosed that tremendous happiness that she always displayed. She could have just gotten out the hospital, but was always glad to take a phone call and never would you even know anything was amiss. Both were avid gardeners even though they had a small lot in town. They raised the prettiest clump of lace fern, blechnum gibbon and lots of staghorns. I always think of Platycerium hillii ‘Panama’ when I would think of them. I say them, because they were joined at the hip and in lock step with each other. They were a beautiful example of marriage, love and devotion. We missed them at the fern meetings, but we knew they were in their happy zone enjoying life and each other. Ted, we are truly sorry for your loss!



**In Memoria
Johnny Williams**



We also lost Johnny Williams this past month after a long year of trying to get well. Our heart goes out to both Donna and their Son. What a sad day for everyone! Johnny was such a gentle giant, he was someone I had to look up to, and he towered over his dear wife Donna. What a sweet, and funny person Johnny was, I personally loved his humor. He always had a smile and twinkling eyes full of mischief and humor. The Williamses both have been very active members of our society, Johnny serving as a board at large and always had thoughts and ideas. He always enjoyed the programs, but had an especially good time when we did the projects. He always wanted his own to do, Donna could do her own, so he joined as an individual member to ensure he got to do

what every was planned. He always helped me with loading and unloading, and when I needed to get the movie screen up high on the hooks, he was always willing to help! I know Johnny loved his plants, orchids, African violets, and yes, the ferns. Always sharing how he was growing different things in the greenhouse. Free with anything he had learned to help someone else enjoy their own plants better. Just a generous man! I wish I had gotten to know him better; it was too short of time; I will however remember him well! Donna will be back to the meetings; she has been taking sometime to process all that they have endured over this past year. We are with you in our hearts!



**Sunday's Topic:
The Ferns of Organ Mountain, NM
By Patrick Alexander**

We will be learning all about the ferns that grow on the mountains in New Mexico. The Organ Mountains are a rugged mountain range in southern New Mexico in the Southwestern United States. Organ Mountains–Desert Peaks National Monument was declared a national monument on May 21, 2014. They lie 10 miles east of the city of Las Cruces.

Patrick Alexander is a botanist with the Bureau of Land Management in Las Cruces, New Mexico, speaking in an unofficial capacity. He is originally from southern Indiana, where he once wanted to be a herpetologist but was seduced by undergraduate courses in botany. At Indiana University he also became familiar with arid ferns in the greenhouse of Dr. Gerald Gastony. He came to Las Cruces in 2004 for graduate school and studied the taxonomy of two genera in the mustard family, *Boechera* and *Thysanocarpus*. After graduating, he did not want to leave New Mexico, so he didn't. When not at work, Patrick can often be found on iNaturalist or walking in straight lines across the desert.



Bio Pic: Patrick Alexander



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/>



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Minutes of Virtual Meeting via “GoToMeeting”

March 21, 2021

Texas Gulf Coast Fern Society

A *virtual* meeting was held due to COVID-19.

Darla called the meeting to order at 2:00.

There were approximately 21 members in attendance.

Presentation: ‘Unfurling up the Mountain: Disentangling Patterns of Global Fern Diversity’

By Jacob Suissa

Jacob Suissa is a Fellow of the Arnold Arboretum of Harvard University and a PhD Candidate, Organismic and Evolutionary Biology. His doctorate will be on the anatomy and physiology of ferns; specifically how cells evolve and how rhizomatous cells work. He wants to answer the questions, “What does it mean to be rhizomatous?” & “How does plumbing occur in a rhizome and deliver to the other

parts of the fern?” He grows many ferns for his doctorate and for fun.

Before the presentation began, Darla Harris mentioned the sad news that two of the Society’s members had passed away. Johnny Williams and Jean Richardson were both long time members. Jean Richardson was one of the founding members and the first secretary of the GCFS.

Climate, Geography and vegetation are all important factors in fern species diversity. There are many more fern species in the tropics. There are low species of plants and animals near north and south poles. Tropics have more species in flora and fauna and even greater numbers in tropical mountain areas.

Mountains in the tropics have many “stacked” ecosystems. These stacked zones range from the mountain top’s alpine region down to its base where it resides in a tropical climate. So the fauna and flora are very diverse. Climate on tropical mountains is very stable in these stacked ecosystems. The phenomenon is called climatic stability.

Factors maintaining diversity change over the lifespan of a mountain system. Most combine fern’s ancient history with its recent diversification patterns. There are 11,000 fern species overall. They are mostly more diverse in the tropics. Ferns are easier to trace because of no distracting fruits or flowers. Their diversity is more clearly the result of abiotic [not derived from a living organism] factors. Taxonomy and distribution of species is relatively well known.

The Swiss botanist, Hermann Christ created the first map of global fern diversity in 1910. In 2020, Anna Weigand et al, released a paper in the Journal of Biogeography on “Global Fern & Lycophyte Richness Explained”. Jacob Suissa’s study aims to characterize global patterns of fern diversity and identify hotspots of richness and endemism. He wants to understand factors that may be contributing to these patterns and ask how phylogeny [the evolutionary history of an organism] informs geographic patterns.

To complete his study, he collected digitized information of fern specimens from Herbariums around the world. He created a global grid map with each cell measuring 100km by 100km. While collecting data, he realized that things can go wrong with coordinated datum. Certain coordinates round out to a nearby town. Nomenclature can get confusing so you must know if a certain species really exists in the area that it is listed.

He found that there were 8 “hotspots” of richness and endemism [restricted in geographical distribution to an area or region]. 58% of global species richness occur in these 8 hotspots which together comprise only 7% of Earth’s land area. These hotspots are: East Asia, Madagascar, Malesia, SE Brazil, Greater Antilles, Guianas, Tropical Andes and Mesoamerica.

Similar hotspots were mirrored by previous scientists Mr. Herman Christ and Mr. R. M. Tryon, Jr. which gave credibility to the new findings.

The majority of fern species are found in the tropics. Mountains harbor enormous richness per area. Hotspot areas above 1,000 meters in elevation cover less than 2.5% of Earth's land surface but harbor nearly 45% of Earth's fern diversity. He wanted to ask the question, "How do species change as you go up the mountain?" and "Can we explain why ferns are species rich in these hotspots?" Across latitudes, richness peaks at mid to upper elevations.

Hotspots harbor a disproportionate amount of climatic space compared to the land area it occupies. Environmental space is larger. Hotspots harbor environmental heterogeneity variation [consisting of dissimilar or diverse elements]. We generally find positive relationships between species richness and niche heterogeneity. Hotspots have more positive relationships than adjacent non-hotspots. Tropical mountains harbor many stacked zones in a relatively small area. For example, the Amazon is flat which does not have a variety of environmental variation.

In the young mountain system, the Andes, the speciation rates are much higher. Young mountain systems create more habitat as they rise due to plate tectonics. Species literally climb up the mountain. Mountains in Southeast Brazil are very old yet they harbor many species of ferns. This region of diverse ferns can be accounted for from the dispersibility of fern spores from regions like the Andes and the Amazon. Other areas are not hotspots yet ferns are still rich in diversity so other unknown dynamics must also play a part in rich diversity.

In conclusion, other studies by previous scientist's research on global fern distribution corroborate current fern studies. There are 8 hotspots of fern richness on Earth: East Asia, Madagascar, Malesia, SE Brazil, Greater Antilles, Guianas, Tropical Andes and Mesoamerica. Many ferns species richness are found in high elevations in these hot spots. Patterns in global climate space are driving this richness. Some species are rapidly evolving in young mountains. Some species are rapidly evolving in older mountains. Some species are older and not evolving at all. These ferns are considered species stable. Some species are evolving not in hotspots and clearly, other dynamics are contributing to their diversity richness.

Question & Answers:

Q – Does deforestation and habitat destruction have a serious impact on species richness?

A – Definitely. The question is, "What part of the world should be conserved?" Certainly, some of the hotspots should be on the list.

Q – Plate Tectonics play a part in species diversity. How about volcanism?

A – Good question. If you take an island system like Hawaii, there are different patterns of species on each of the

islands because each island is a different geologic age. It is whatever fern species gets to the island first which will define the island's fern's diversity. The fern flora of Hawaii is really diverse.

Q – How did you create the grid?

A – The grid was created as if the land was flat and did not incorporate the mass area of the mountains.

Q – Are epiphytic ferns more likely to diversify than terrestrial ferns?

A – Epiphytic ferns seem to evolve more rapidly. However, a recent study concluded that terrestrial and epiphytic ferns are not evolving at different rates. It is just that certain areas are epiphytic fern rich with many epiphytic fern lineages.

Q – What about the older genus of ferns that do not diversify?

A – An example would be Malaysia which has old genus lineage. Sometimes, old single lineages just "hang out" in certain regions and never diversify.

Q – Are hotspots related to the tropical rain forests?

A – There is not that strong a correlation. For example, the Amazon rain forest is not a hotspot for ferns. Instead, the mountain regions are species rich.

Q – Is soil ph playing a factor in species diversity?

A – Soil ph & soil organic matter was included in the study. On a global scale, the resolution was not strong enough to draw a solid conclusion but certainly, soil ph plays a big part.

Q – According to one of your maps, it would look like the arid areas of the United States are much higher in species richness than the Mississippi Valley? The Mississippi Valley looks white like it did not have any ferns.

A – Did not really pay attention to the U.S. and cannot make a strong conclusion on that. The large white areas are white because these areas might be rich in ferns but they were limited to their information. Because #1.) People collecting might only obtain certain species of fern. #2.) Ferns in herbariums were not digitized so could not acquire that information.

*A GCFS member noted that the Mississippi Valley is flat whereas the arid regions have higher elevations.

Q – If you grow ferns in horticulture, you are more successful when they are grown on a sloped surface. The aeration is better for the roots. How does this play a part in fern diversity?

A – In the areas with topographic changes, he doesn't think that slopes play a big factor in species diversity.

It was noted that the next meeting is April 18. The presenter will be the one that was scheduled in February but was unable to attend. The topic will be, 'The Ferns of Organ Mountain, NM' by Patrick Alexander. In May, Daniel Yansura, will present, "Ferns of Bali". Photos and information will recount his experiences from an expedition there.

Respectfully submitted,
Ceil Dow



4th Quarter 2020 Treasurer's Report

Income:

Dues: \$30.00

Interest: \$0.34

Expenses: None

Balance on 12-31-2020: \$15,082.53

Balance on 03-31-2021: \$15,112.87

Net gain for 1st Quarter: \$155.36

Net gain for 2021: \$30.34



New Member

We have a new member: Normand Nakaniski. Please welcome our latest member (when you get a chance).



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Darla Harris on: Surviving the Great Houston Freeze of 2021

As you know our area got hit with colder weather than has happened in 100 plus years. With four back-to-back fronts it kept the cold spell here for a week. The power outages that few foresaw really hurt a lot of tropical plants both in the greenhouse, garages and defiantly in the landscape.

The following are some of the ferns in my yard that survived the 8-10⁰F and under freezing for 36 hours, with both a blanket of snow and then ice, it was a week I hope we don't repeat here in the greater Houston area any time in the near future. The following ferns were already pushing new fronds about three weeks after the freeze. Winners in my book! I hope yours too.

All photos by Darla Harris



Dryopteris erythrossora – Autumn Fern



Pteris Fairiei



Polystichum tsus-simense – Korean Rock fern

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Adiantum raddianum "Fragrans"



Dryopteris cycadina – Shaggy shield fern



Microlepia strigosa – Lace fern



Arachniodes simplicior – East Indian Holly



Blechnum occidentale – Hammock fern



Pteris ensiformis "Evergemeiensis"



Athyrium niponicum – Japanese Painted fern