



Society For Economic Botany Newsletter

PLANTS & PEOPLE

A biannual newsletter published by and for the members of The Society For Economic Botany

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Jamaican Coat of Arms



2020 Conference

Society for Economic Botany and International Society of Ethnobiology

In Collaboration with the New York Botanical Garden

Out of Many, One People: Biocultural Diversity across Borders

The University of the West Indies
Kingston, Jamaica

May 31-June 4, 2020



NYBG

Registration, Lodging, and Submission of Papers

We are busily coordinating all efforts for an amazing international meeting, so keep tuned on the website for details.

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Plants & People

**The Newsletter of
The Society
For
Economic Botany**

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<http://www.econbot.org>

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The articles within the Newsletter are independently submitted and do not represent the position of The Society For Economic Botany as a whole.

Deadlines for submissions are February 1 (Spring Issue) and September 1 (Fall Issue).

Notes from the Field

Wow!!! Winter is already approaching: how can that be?

This Issue is full of Ethnobotanews and, of course, plenty on the 2020 meeting in Jamaica with our DEB Diane Ragone. She will talk about Breadfruit and you can be sure we will have the opportunity to taste it during our banquet and other times.

The Jamaican team has an amazingly full program—lots of science, but lots of local flora—so we will be immersed in the culture.

Plan ahead and plan soon.

Trish Flaster



What You Can Do for Climate Awareness

On the 11th hour of the 11th day of every month in 2019, church bells, shofars, and gongs ring for 11 minutes in downtown Boulder and other houses of worship and locations in Boulder County to call awareness to the need for urgent climate action.

If you are not in Boulder, feel free to join us anyway for 11 minutes at 11:00 wherever you are.

Pray, meditate, walk, sit, sing ... whatever gives you courage.

All with peaceful intention are invited. Feel free to spread the word.

We are hoping to start a Facebook group soon so people could share what they do with others. If you want to specifically be involved ... you are INVITED. Please respond to 11thhourcalling@gmail.com (that is 2 h's) and we will put you on the list.

Start an event in your community!

Forest Steward Guild Meeting

Bottomland Hardwood Learning Exchange
November 6-7, 2019 (Baton Rouge, LA)

What will you learn? This event brings together forest landowners and resource professionals from across the South to understand wildlife forestry practices in the Lower Mississippi Alluvial Valley. An emphasis will be placed on how robust forest product markets, low-impact harvesting equipment, and selection system silviculture can play an integral role in meeting wildlife habitat improvement goals for forest interior birds. We will also focus on connecting family forest landowners to available resources to better steward their woodland. Through this event we hope to improve the management and conservation of bottomland forests across the South and illustrate opportunities to meet diverse social values.

Preliminary Schedule

The event will include a ½-day indoor session of presentations and discussions, followed by a full 1-day field tour to state and private lands.

- November 6: 11:00 a.m. – 4:15 p.m. with optional social and provided dinner from 6:30 – 8:30 p.m.
- November 7 Field Tour: 8:00 a.m. – 4:30 p.m.

Download agenda: <https://foreststewardsguild.org/wp-content/uploads/2019/08/LMAVLExAgenda2019.pdf>

Fee:

\$25 (includes some meals)

Details & Registration:

<https://foreststewardsguild.org/event/bottomland-hardwood-learning-exchange/>

Hosted by:

Forest Stewards Guild in partnership with the Louisiana Department of Wildlife & Fisheries, The Nature Conservancy, and the USDA Natural Resources Conservation Service

Forest Stewards Guild website:

<https://foreststewardsguild.org/>



Meeting Business 2019

We are happy to announce that Council members have been very busy to keep our Society vibrant.

We encourage all of you to be active: volunteer and recruit members. Like most organizations recently, our members are decreasing so we need you to renew and facilitate memberships for other students, foreign colleagues, etc. What to offer a collaborator? Give them a SEB membership!

Here Are Some Highlights

Journal submissions are up 60% and our Editor continues to offer us an excellent publication. Have you submitted anything recently?

Awards submissions were on the increase: the Schultes Award had 18 submissions (no wonder the judges had such a difficult time choosing a single awardee). See Awards on page 4.

We continue to allocate funds for student awards and travel. We also have international travel awards.

We want to open nominations to Society positions. Please, if you have someone in mind for council positions, student positions, or committees, let us know—there is plenty of room for you.

We are asking you for nominations for the Heiser teaching/mentoring award (student nominations) and for future DEB (nominations from all members).

We also are seeking future meeting sites: we need your University, so please talk to us about meeting venues.



Medicinal Cannabis Exhibit at the Lloyd Library

Submitted by Jillian De Gezelle, Ph.D.
jmdegeze@ncsu.edu

Since we were in Cincinnati, I was of course very interested to check out the Lloyd Library and Museum, an independent research and archival library devoted to medical botany and pharmacy. How lucky that they were having a special exhibit with artifacts and other materials from The Cannabis Museum of Athens, Ohio, called “Through the Rx Bottle: Medicinal Cannabis 1841-1937” on display during our time there. I made my way over to the Lloyd Library from campus and happened upon a few other SEB members and students there checking out the exhibit and doing their own research using the library’s collections.

Cannabis was historically used medicinally in the United States legally, until prohibition in 1937 through The Marihuana Tax Act. The Lloyd Library had several of their rare books on display in the exhibit with beautiful botanical illustrations of cannabis plants. The Lloyd Brothers Pharmacists, after whom the library is named, are best known for their work on *Echinacea*, manufactured cannabis medicines, like many other major drug companies before prohibition. The exhibit displayed the antique apothecary bottles and packaging from various cannabis medicines historically produced for uses ranging from sleeplessness and pain, to women’s health, to children’s ailments, to veterinary medicine.

What a great field trip, thank you.



2019 Awards

We offer many types of awards to SEB students. To see more about eligibility, etc., please view <http://www.econbot.org/home/awards.html>.

There were so many excellent submissions that the judges had a difficult choosing only one. Thank you judges and we are so grateful to our students as they are the future of our Society.

Fulling Award for the Best Young Professional Oral Presentation—2019

Teal Jordan, Pennsylvania State University

“Ramping Up the Harvest: Phytochemical Variation in *Allium tricoccum* Across the Growing Season in Pennsylvania”

Morton Award for Best Young Professional Poster 2019

This year the judges found that there were two posters deserving awards. One award was given to **Lan Truong**, who is studying at CUNY, New York Botanical Garden. Her poster was “Traditional Vietnamese medicine for diabetes treatment in southern Vietnam.”

The second award was given to **Elsbeth Mathau** from the University of Kent. Her poster was “Adaptation to Changing Fodder Accessibility in Two Moroccan High Atlas Mountain Communities.”

Schultes Award for Field Research in 2019

James Lucas—Washington University-St. Louis.

“Following the Paper Trail: Using Population Ecology to Inform Conservation of an Endangered Papermaking Tradition in Vietnam.”

This was an “excellent proposal ... well-written and meaningful,” a “clear, well-defined question with reasonable methods outlined to answer it ... practical in its consideration of broader impacts and student training in Vietnam,” and a “compelling and well-thought-out and designed project, with clearly stated broader impacts.”

Grace Ward—Washington University-St. Louis

“The Historical Ecology of Hunter Gatherers in the Lower Mississippi Valley.”

“A strong proposal,” “deep and convincing background and connection to broader question,” “an important case study to an understudied region in the US. Provides training for Chickasaw students in heritage management.”

Honorable Mentions

David Felipe Rodriguez Mora—North Carolina State University

“Integrating Ecomorphology and Ethnobotany to Test Cofán Ethnovarietal Classification of *Banisteriopsis caapi* in Southwestern Colombia.”

Lilly Zeitler—University of Kent

“Understanding the Role of Ethnic and Religious Diversity in Medicinal plant use between Tai Yai and Lisu Buddhists and Christians in Northern Thailand.”

Our most important award is, of course, the **DEB (Distinguished Economic Botanist)**, which was awarded to **John Rashford**. John has been an active member in the Society, fulfilling many roles on the council including Treasurer and President. His impact has been noticed in the field and in our Society. His lecture during the 2019 banquet was a joyous celebration of his life that found numerous connections between cultures and plants, especially trees. We know him for his love of the Baobab, but also for lectures, books, and his musical talents at all our meetings. Thank you, John, for years of service and for opening our hearts to your rich journey.

Heiser Award for Mentor

The final award was given to an outstanding Mentor. The 2019 Charles Heiser Award was given to Cassandra Quave from Emory University. The students nominated her because of her never-ending leadership and support for the maturation and advancement of her students.

2020 Distinguished Economic Botanist Interview

Dr. Diane Ragone, October 10, 2019

Submitted by Aja Grande grande@mit.edu

Born and raised in Roanoke Virginia, Diane eventually found her way to the middle of the Pacific where she has spent the past thirty years addressing how to alleviate world hunger via breadfruit. From agricultural market news reporting in the cold winds of Chicago, to laying the groundwork for whole generations of new research on understanding breadfruit diversity, her path to becoming the Distinguished Economic Botanist of 2020 has been no straightforward route. Read forth for a conversation with a lively ethnobotanist whose initial interest in island culture and food security led her onto an ambitious and generous path.

Aja: What got you interested in breadfruit?

Diane: When I was doing my Masters in horticulture at the University of Hawai'i, I was interested in more than just the horticulture and related plant science classes. Being in Hawai'i, I was interested in the Pacific culture, especially the Polynesian aspects of living on an island. I branched out beyond the University of Hawai'i's College of Agriculture and took classes in the Pacific Island Study program because I figured it'd be an opportunity to learn more about Oceania. It was a class on French Polynesia that got me interested in breadfruit.

For an assignment, I wanted to write a paper on a traditional tropical fruit crops and I decided to write about breadfruit. It was really from that, and from trying to have an interdisciplinary approach to my graduate study that it all blossomed.

Aja: You're talking about how breadfruit was important to Pacific islands, but you mention that wasn't the case in Hawai'i at the time, that breadfruit wasn't important or imminent, at least in the 1980. That was something you saw just as a graduate student in local culture or in Native Hawaiian culture?

Diane: Living in Hawai'i—I've been here since 1979—I had had very little knowledge or experience of breadfruit. You hardly saw breadfruit trees. I mean there are trees and they are in certain parts of the islands, but it just didn't seem to be very important until there was a Hawaiian Renaissance in beginning in the 1970s and it included a reemergence of Hawaiian music, language, food, and everything cultural. Breadfruit though was never as important compared to Tahiti where breadfruit was brought from—because



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DEB Interview

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there was really only one variety here in Hawai'i and not a lot of trees. So once I started doing this library work, and started reading more about breadfruit, I started noticing it more. It had been more important in Hawai'i pre-contact as there were groves throughout the islands and on the Big Island an extensive breadfruit agroforest in the Kona area. Over subsequent decades, knowledge and use of breadfruit declined as the islands were transformed into a plantation economy. In general, Hawai'i did not have as rich a breadfruit culture as does Samoa, Tahiti, and many islands in Micronesia, and parts of Melanesia. On these islands, it's their staple crop, it's incredibly important and there are a lot of trees and a lot of varieties.

Aja: In the field have you encountered any issues? What issues have been the most pressing in the communities you work with, such as in Samoa? Since you work with the communities that produce breadfruit for their own subsistence, they may come up with issues such as insects or pest control?

Diane: I started doing fieldwork in 1985 and continued in 1987 and then again 1996-2005. My focus was still on breadfruit varieties, but more on the traditional practices associated with food use. I think the biggest challenge was the loss of traditional knowledge, and the loss of varieties, which is why I began this work. When I interviewed local people, they were concerned about the loss of varieties, and that people weren't growing as much breadfruit, nor the different varieties. Another thing was that people were eating more rice, not eating breadfruit and other traditional foods. I saw more and more of that transition from the 1980s to the 2000s. Part of that is also related to environmental changes that we're seeing with droughts, storms, and hurricanes, breadfruit trees would be blown down or damaged. And this was in the 1980s, so you can imagine how that's accelerated it is now with climate change events in the Pacific.

Aja: What kinds of criteria do you use to establish "best" varieties?

Diane: Based on five years of research on the breadfruit collection, I graphed, and looked at the variation in production. Which trees were producing fruit and when over the course of the five years, I was especially interested in the dips in the graphs because trees producing in the dips are off-season varieties. And in some cases, there's one or two varieties, say in the month of May, and then in September or October there are fifty or a hundred varieties fruiting. I then looked more closely at my field notes and at the varieties. I tasted and sampled and picked a set of varieties, according to when they fruited based on five years of seasonality data in one location, I then picked varieties that were very common like the

Ma'afala—on a lot of different islands, so I knew people liked it. So I used different criteria to pick that core group. And so that was the group that we did tissue culture work on for propagation. This methodology hadn't been developed. And then other research projects emerged through a collaboration with the University of British Columbia at Okanagan.

So this is groundwork for a whole generation of new research on breadfruit that cannot be done on a living collection, but can answer questions about breadfruit productivity and cultivating breadfruit. The most important thing to me is the conservation of different varieties and the associated knowledge about how breadfruit can play a significant role in alleviating hunger, providing food security, and income generation for small-scale entrepreneurs, and economic development.

Aja: How did you find yourself doing a Masters in Hawai'i?

Diane: I lived in five states and one foreign country after my undergraduate, working in different areas of horticulture. In 1979, I decided to move to Hawai'i because I wanted to live where it was warm... after living in Chicago for a winter, working as a market news reporter for the USDA. Chicago got me looking at food systems because all the food comes into these wholesale food markets. I moved to Hawai'i and got a job as a gardener in a private botanical garden. I did manual labor for about a year. Then I lived on a tropical food farm in Australia for about a year, then came back to Hawai'i, and that's when I decided to do my Masters. I wanted to study tropical horticulture.

Aja: So it was sort of a roundabout way that you had got into breadfruit?

Diane: Yes, I easily could have had a thirty-year career with the USDA, and been a market news reporter for my professional career. But I decided I didn't want to do that, I wanted to do something different. After thirty years of working with breadfruit, I still enjoy it because of the multidisciplinary, interdisciplinary approach and in that way, it typifies the Society for Economic Botany and the whole foundation of the society—the work and mission of the Society since its inception.

Aja: Do you know if any Native or Indigenous folks have come out directly to say that they're looking for different varieties of breadfruit or looking for best practices to grow them? Has anyone voiced that kind of inquiry?

Diane: Yes. Jamaica already has an incredibly rich breadfruit history and culture. Jamaica and Saint

Vincent were the two islands that first received breadfruit from the Pacific in the early 1790s. Today, those engaged with us are small-holder farmer associations, and all local people. One of our partners is actively working in Haiti with the small-holder farmer association groups, orphanages, and other groups. In Africa, in particular, everyone has contacted us and are interested individuals, farmer groups, or non-profit groups. My work is focused on conserving and studying breadfruit diversity and providing good, quality



varieties for hunger alleviation, for reforestation, and economic development for small-holder farmers and communities in the tropics.

In 2010, the Breadfruit Institute partnered with the Hawai'i Homegrown Food Network, and we launched Ha Ulu Ka 'Ulu to revitalize breadfruit in Hawai'i. We started a huge statewide educational campaign to raise awareness about breadfruit and its importance for Hawai'i for food security. I started a project called Plant a Tree of Life, Grow 'Ulu, the Hawaiian name for breadfruit, and distributed more than 10,000 trees throughout the state working with over 200 community groups and organizations.

Aja: This is a more playful question, but what kinds of recipes have you enjoyed most?

Diane: I'm old school in the way I eat breadfruit. The first time I ate breadfruit was in the Pacific in Samoa where they cook it in an umu, and then you just eat it that way—roasted in a fire with coconut cream—I love it that way. We do cooking contests, and the dishes people make are pretty incredible. Though I myself, I eat it the way I eat a potato. So I make a gratin. I use it to make an Ulu salad instead of a potato salad. My go-to dish, though, is when I'm introducing someone to breadfruit for the first time is to make breadfruit nachos.

Perspectives from Some Students

The SEB conference in Cincinnati was a wonderful and insightful experience. I really appreciated how welcoming and helpful the community was as a first-time attendee and student. It was really exciting to be at a conference that brings so many perspectives and disciplines together, and fosters dialogue and collaboration between researchers.

Though I found so many of the talks to be insightful and innovative, there are a few, especially from the first day, that stood out to me. Kat Anderson's opening lecture on mixed conifer forests of the Sierra Nevada shed light on the TEK of the indigenous groups of the region for forest and fire management, contrasted to the current regimes at work. Being from California and spending a lot of time hiking and working in the forests and parks, including the Sierra Nevada, indigenous management and presence has been largely erased and is taught as if these communities are past tense. Though disheartening to hear about what these forests would be like in better health and how indigenous knowledge and management has been erased and dismissed, I appreciated Anderson's optimism about how private forest management could change things in future as the mixed conifer forests of the Sierra Nevada make up a significant portion of forested land (~40%).

Resilience and optimism for revival of traditional management strategies was a theme through many of the talks. Studying and working in the environmental field, one often gets pessimistic about the state of the biosphere, so it is nice to hear about applied and impactful research and community-based projects making a difference for communities and ecology. Michael Dockry's and James Miller's presentations demonstrated this on the first day: both were both positive in this way. Dockry's talk on Building Partnerships with Tribes to Integrate Indigenous Knowledge into Natural Resource Management was inspiring not only for the sustainable harvesting practices and conservation success in the Menominee Nation, but also because he highlighted experimentation and future planning for changes in tree populations and ecology from impending diseases and climate shifts. Robert Bye and Edelmira Linares' talks on the Sierra Tarahumara forests and continuity of traditional land management and foodways were also engaging and optimistic. The film from their work with The Rarámuri on traditional food processing techniques was a great addition and an effective and artistic way to communicate the practices and plants integral to their food system in Rarámuri's own words.

John Rashford's Distinguished Economic Botanist award speech was a wonderful way to end the conference. He brought the audience through events in his childhood, early research, and present work to weave a story of his journey into ethnobotany today. Gaining a better understanding of how he was able to bring together his different areas of knowledge was a helpful illustration of effective interdisciplinary work. But, importantly, he showed how he was able to involve and give back to the communities he worked in beyond his research.

The SEB conference was a wonderful experience, and the University of Cincinnati and SEB organizers did a wonderful job. I am excited to continue my membership and participate in future conferences and SEB work.

Elsbeth Mathau
elsbeth.mathau@gmail.com

The 2019 SEB conference was my first attendance, as I have just finished the first year of my Ph.D. As a relatively new student, I learned a lot from listening to the diverse presentations made throughout the week by seeing how other people conduct their research and frame their questions. Most important to me was to build relationships with participating communities. I was able to reevaluate my own plans to ensure that my aspirations don't supersede the wants and needs of the communities with whom I am associating, while still accomplishing the goals of my research. I think my feelings were summed up nicely during Dr. James Miller's talk when he said that peoples' lives should get better when you work with them. In my opinion, the work that Dr. Miller has done with his team at the Missouri Botanical Garden is the gold standard for making a lifelong commitment to the people and place for any Ethnobotanist.

Another presenter who embodied what it means to me to be an ethnobotanist was, of course, Dr. John Rashford. He took the time to understand the long social, political, and spiritual histories that led to the present-day relationships that people have with the land in the communities where he worked. Dr. Rashford's inspiring talk has gotten me to dig deeper into the somewhat elusive past of the communities that I am working with, who have carried their histories primarily through oral tradition. Dr. Rashford and many other presenters from the week have reminded me that contextualizing my research will help me find more meaningful answers to my questions and allow me to build relationships based on mutual understanding.

Best,
Grace gaulman@ncsu.edu

The Economic Botany 2019 conference in Cincinnati was an incredible experience. This was my second Economic Botany meeting, years after the 2014 joint conference between SEB and SOE in Cherokee. I am a postdoctoral scientist and ethnopharmacologist specializing in the study of disease-modifying botanicals for Parkinson's disease. I have participated in many scientific conferences, but none match the influence that the SEB conference has had on my personal and professional development. While most conferences are a succession of scientific talks aimed at sharing one's research, Economic Botany is uniquely infused with a sense of making the world a better place. I particularly enjoyed the panel discussion on ethics in ethnobotany, a central topic in our field that requires everyone's attention. This session allowed friendly, yet vigorous and honest discussions and sharing of experiences and perspectives. This conference also allowed me to give my first oral presentation, meet people from all over the world, and initiate collaborations. I had fantastic discussions with scientists who had an important impact on my own research, and I was incredibly lucky to be individually mentored and collectively encouraged at the mentoring workshop as I am now entering the job market for faculty positions. The SEB Economic Botany conference is always an inspiration to be a better ethnopharmacologist, and I am very proud to be a member of this exceptional community!

Aurelie de Rus Jacquet, Ph.D.
Postdoctoral Scientist, Howard Hughes Medical Institute, Janelia Research Campus, Loudoun County, Virginia aureliederus@gmail.com

I am Dr. Santhosh Kumar J. U, from India. I was the student/Postdoc travel grant recipient for SEB 2019—"The Future of Forests: Perspectives



Perspectives

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from Indigenous People, Traditional Practices and Conservation.” My goal at the conference was to discuss the advancements in the use of medicinal plants, post-market surveillance, safety assessment, quality control methods, health risk and adverse event reporting for botanical herbal medicines. It was an opportunity to present and discuss the Indian contribution to the quality control of herbal medicines and current status of ethnobotany studies in women’s healthcare. I presented the results of an ongoing project—“Ethnobotany Studies of Women Healthcare System in South Indian Ethnic Communities.” We documented and evaluated the traditional knowledge of the region, compared the distribution of knowledge, and examined where research efforts are concentrated to gain a glimpse of current needs and future possibilities for research. I was able to introduce myself to the SEB community, and learned a lot about trends in ethnobotany aspects during field trips and mentor discussion forums. I met ethnobotanists from different parts of the world, working on diverse and interesting research projects. For the first time, I have personally evaluated the significance of such events, notably the importance of scientific collaboration and the exchange of ideas.

Through presentations I gained a greater understanding of phytochemical studies, origin and evolution of medicinal plants, ecological aspects, and the history of traditional food plants.

Finally, the collective knowledge helped me to reflect on regulating the quality of Indian herbal medicines and improving its trade value. Having built the base of my understanding of medicinal plants research, I look forward to an opportunity to put them to use in India. I would like to make a lifelong commitment to the field of research in traditional medicine and medicinal plants since I believe it leads me to the attainment of fulfillment.

Dr. Santhosh Kumar J U

Department of Pharmacognosy and Pharmaceutical Botany, Faculty of Pharmaceutical Sciences, Chulalongkorn University, Bangkok



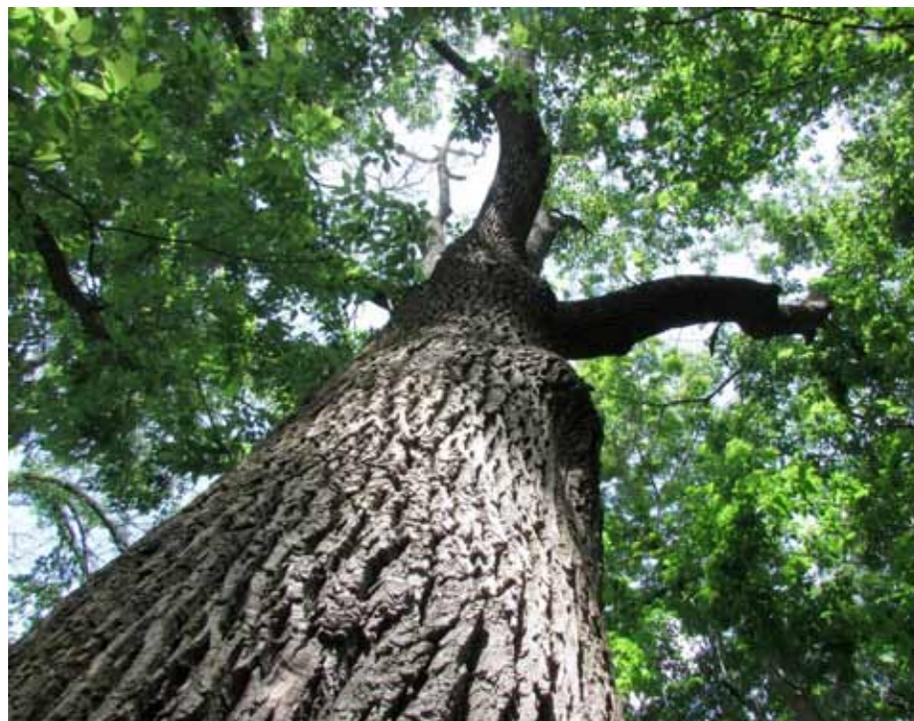
A Workshop at the SEB 2019 Meeting

Submitted by Madeline Donald
madi.donald@gmail.com

Jeffrey Wall, Morgan Ruelle, and Michelle Baumflek ran a wonderful workshop entitled, “Compiling Tools and Charting the Course: Co-Creating an Ethnobotanical Evaluation Toolbox for the Anthropocene.” The maze that is the University of Cincinnati campus had us all a bit lost, but thanks to some collaborative effort, heads and tails were eventually made of the three-dimensional map and we succeeded in congregating as a small group. Some initial confusion about the nature of workshops and resultant shuffling resulted in a group just the right size to conduct an icebreaker, which if not the highlight of the workshop in terms of intellectual stimulation, was perhaps the most memorable portion. With plant names written on sticky notes placed on our foreheads we were to pepper each other with yes/no questions about the characteristics of our plant. With varying degrees of taxonomic stringency in the room, mine surely being among the lowest, I ended up asking questions like, “if you were not a botanist, would you call me a berry?”

After the ice was broken, the workshop went on to probe our ideas of value and valuation, a topic of central importance to my work specifically and, I would argue, to all of the work we do. As a group, we worked to envision a valuation toolbox for practitioners, students, and researchers. So often our valuation schemes fall into patterns dictated by their comparability to others in far-off places, to the detriment of context-specific factors. It was inspiring to have people in the room from various origins, backgrounds, and research foci brainstorming about what a more democratic structure for the conservation of plant value might look like.

To top it off, Drs. Wall, Rulle, and Baumflek presented their own recent work as case studies in which concepts of valuation were salient. To listen as someone speaks about work they have been engulfed in for years and be able to then ask questions about their approach and their thinking around various aspects of their study is, in my opinion, one of the highlights of academic conferences. In this small room in a corner of the biology building, the potential for that sort of interaction was amplified. Since the workshop, I have thought back to each of their case studies multiple times. Thank you.



Ethnobotanews

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In the News

Three finalist teams from the Biomimicry Global Design Challenge, all from California State University, Long Beach, put their biomimicry skills to the test by developing concepts to maximize land use and preserve water in rice production, collect water from fog, and reduce the debris flow that occurs during fire and flood cycles. Read more about their winning projects.

In a Climate One talk called “Can a Circular Economy Salvage the Climate?”, Beth Rattner, along with John Lanier, Executive Director of the Ray C. Anderson Foundation, and Peter Templeton, President and CEO of Cradle to Cradle, explains how design in nature differs from design by humans.

In the photo below, Peter Templeton is at photo left, Beth Rattner at photo center, and John Lanier is at photo right.



Cannabis—What is New

Cannabis is big business worldwide, an economic crop that has become a commodity before it is legalized. Now that the Farm Bill of 2018 has been approved, Hemp (Cannabis with the legal amount of 0.3% THC, in the United States, globally 1%) is everywhere. Products are in most health stores and pharmacies. But where are the data? What is next? Let's hope more funds will be made available once the USDA Marketing guidelines are made available and the U.S. Senate approves the Banking Act.

A Much-Needed Paradigm Shift Toward a Whole Plant Approach

By Bob Hoban, Pres./Fndr., Hoban Law Group

You'd never make it in the NHL if you were a defender who always followed the puck. It's not about where the puck is now, but all about anticipating where the puck is going. The same is true for the people thinking about the hemp industry as the cannabinoid industry. It's time to shift toward a supply chain perspective.

In no way do I mean to be the bearer of bad news, but the CBD market is saturated. How could there be an inundation of processing, brands, and supply, yet no one realizes it? Because right now, it's not a traditional industry. It hasn't been commoditized by mainstream players. Up until this point, the big companies that own mainstream global distribution, the Nestlés and Krafts of the world, have only dabbled in the hemp industry. When they enter, they will structure it in such a way that buyers and sellers meet up and marry as they do in every other industry, with every other product.

I'd rather be the backbone for the industry from a supply chain perspective. And the supply chain starts with genetics. Right now, when people talk about hemp seed, they think in terms of grain, fiber, or CBD varieties. I don't see it that way—and neither does the Farm Bill. It's a hemp crop.

Cannabis Can End Disease and Poverty

By Vi Waln, September 22, 2019

https://beardog.org/2019/09/22/cannabis-can-end-disease-and-poverty/?fbclid=IwAR07JgkHR Lij5RZYyzv_eZejMUGmcTdtxBi136OmwG-wl9gKERTKOss8bcM

White Plume Hemp Harvest

September 20, 2019

I attended the White Plume Hemp Harvest near Wounded Knee Creek on Saturday. It was a perfect day to be outside and visit with friends. A prayer of gratitude was offered for the Hemp relatives that would be harvested for medicine. It was an awesome day in the sun witnessing an absolutely legal harvest of mature hemp plants in Oglala Lakota County, South Dakota.

Alex White Plume has been growing hemp for decades. Initial crops were confiscated by federal agents, as hemp was considered an illegal drug for the minuscule amount of tetrahydrocannabinol (THC) the plant contains.

Cannabis plants include both marijuana and hemp. Both types contain cannabidiol (CBD) and tetrahydrocannabinol (THC), which are natural compounds of the plants.

Industrial hemp, which was declared legal when the federal government passed the recent Farm Bill, is a cannabis plant that contains less than 0.3 percent THC. Marijuana is also a cannabis plant, containing a much higher concentration of THC. High levels of THC in a cannabis plant provides the intense psychoactive effect that marijuana recreational users seek.

Kristi Noem, Governor of South Dakota, made her stand on industrial hemp known to the entire globe through a recent editorial published in the Wall Street Journal. She chooses to overlook the medicinal benefits of hemp because “Hemp and marijuana look and smell the same. Police officers can't tell the difference between them during a traffic stop.” <https://www.wsj.com/articles/why-i-wont-support-legalizing-hemp-11568068697>.

Consequently, South Dakota—as well as the rest of the country—is battling a war against methamphetamine. A majority of Lakota people have been affected by meth, either by succumbing to addiction or watching a family member lose everything because of their drug use.

The Governor could make better use of her time by focusing on how to eradicate meth from this state, instead of worrying about how the cops are going to tell the difference between cannabis plants. Many of us wonder why she's demonizing a natural medicine that might actually help meth users overcome their addiction.

Cannabis users, whether it's marijuana or hemp, will give testimony to the healing properties of CBD/THC. For instance, numerous people who use CBD products can tell you how the medicine has changed their lives. People who suffered from chronic pain are now going through life either free of hurt or cured from a terrible disease. CBD works



Photo of White Plume Hemp Harvest by Vi Waln

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Ethnobotanews

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better than any pain medication on the market. Even more effective is the fact that CBD products don't have a mile-long list of side effects, often cited in television commercials marketing new drugs.

Healing properties contained in many plants, trees, animals, and water were the medicines our ancestors used. Nature is a living being and has guided Indigenous people to medicines needed for our ailments. Indigenous people carry this knowledge and we will pass it on to our children. We must wean ourselves off of the poisons prescribed by Indian Health Service providers. Too many of us watch our own good health deteriorate as the list of prescriptions we take home increases.

It's time for us to reclaim the plant-based cures for the diseases our people suffer; synthetic drugs have already killed too many of our relatives. Scientists working with cannabis plants have developed strains to focus on specific illnesses, like cancer or diabetes. I'm grateful to the sovereign tribal governments in South Dakota who've developed, and continue to draft, legislation legalizing cannabis plants. Hemp, along with medical/recreational marijuana, has the potential to end the abject poverty affecting the majority of our tribal citizens. That is, tribal entrepreneurs and businesses could prosper from taxed, retail sales of cannabis.

Kudos to the White Plume Tiospaye for their persistence in caring for our cannabis plant relatives in Lakota country. Rosebud White Plume and Tyson White Plume will manage the White Plume Hemp business. Alex White Plume will focus on developing hemp seed. Get Ready To Wear Hemp Kelly Bastone // September 20, 2019 https://www.rei.com/blog/hike/get-ready-to-wear-hemp?fbclid=IwAR0DNjMs3BrqF3Wdwl_gb-J5xbNSynAQ8C_XZM_qMCrNxGng5N8d-JqbNGM5U

Now that U.S. farmers can legally grow this drought-tolerant fiber, hemp is becoming a hot commodity among sustainable clothing brands.

Move over, cotton: Hemp is here to challenge your throne. Now that hemp is no longer considered an illicit drug, fabric manufacturers are figuring out how to turn this notoriously scratchy fiber into soft, ultracomfy clothing. It's showing up in T-shirts, shorts, fleeces, jackets, hats, and even shoes. Even better? Hemp's sustainability scorecard makes it one of the most environmentally friendly options for apparel.

Until recently, U.S. laws complicated the use of hemp—which, like marijuana, is a cannabis plant. But hemp contains no more than 0.3 percent of the psychoactive THC that gets people high

(marijuana, meanwhile, contains 5% to 20% THC). So after a long time coming, the Agriculture Improvement Act finally removed hemp from the Controlled Substances Act in December 2018, opening up its use in everything from animal feed to textiles.

That's a good thing for apparel brands because the plant grows fast (requiring as few as 108 days to harvest, compared to 150 to 180 days for cotton). It also needs relatively little water—so while cotton demands abundant irrigation, hemp can get by on rainwater alone. Moreover, hemp requires very few pesticides and fertilizers, yet yields 250 percent more fiber per acre than cotton.

"Its deep root system has even been credited with being restorative, bringing minerals and nutrients up from deep in the ground," says John Rapp, senior clothing designer for Patagonia. "Hemp is much less taxing on the topsoil and environment as compared to other popular crops that are grown for apparel use. If more manufacturers adopt this fiber, our footprint will continue to decrease."

Luckily, many manufacturers are adopting this fiber. For spring 2019, Toad&Co used hemp in 15% of its line. REI Co-op featured it in 20% of its sportswear, including the new natural-fibers Westerlands pieces. prAna had hemp in 61 styles. Patagonia debuted an expansive hemp collection that includes breezy sundresses as well as burly coveralls. And after dabbling with hemp in fall 2017, Astral expanded its line of hemp-based water shoes with three new spring 2019 models.

Looking to upgrade your wardrobe with hemp? Check out prAna's "Kickin It Jogger Pants" and/or its "Lenny Overshirt," Patagonia's "The Forge Hat," Toad&Co's "Epique Hoody," and REI Co-op's "Westerlands 3/4-Sleeve Knit Shirt."

New manufacturing techniques are even allowing brands to turn hemp's stiff, fibrous stalks into something soft enough for human hides. In March 2019, Levi's debuted a buttery denim made of hemp and cotton, and the company is aiming for an all-hemp version within five years. prAna's Cardiff fabric (which blends hemp with recycled polyester and Tencel) is soft enough to sleep on, and the fleece version (used in the Norcross Crew Fleece Sweater) is as fluffy-cozy as any classic sweatshirt.

Hemp is also antimicrobial—resistant to odors—and more durable than other alternatives, so it will be popping up in heavier-duty work wear and trail clothes. (Autumn Clark, a product designer for the Co-op, says REI will look into introducing the fiber into its trail collections in future seasons.) Still, even basic T-shirts benefit from hemp's longer

lifespan, since garments that stay wearable stay out of landfills. Plus, it has a distinctive slubbed texture that apparel designers love. "It adds an interesting visual texture to the fabric blends we create with it," says Andrea Cinque-Austin, prAna's design director. In prAna's "Vaha Short," hemp makes the fabric look more sophisticated than your typical workout wear, while also mitigating body heat and odor.

Hemp's popularity shows no sign of slowing down. While the fiber's early adopters state that they intend to ramp up their use of hemp in 2020, additional brands are joining the movement: In spring 2020, Smartwool will introduce men's pieces that blend Merino wool with polyester and hemp (look for the "Everyday Exploration Short Sleeve Henley" and "Everyday Exploration Pocket Tee" in select REI stores and on rei.com next April).

"We're pursuing innovation through natural performance fibers because our goal is to become more sustainable," says Andi Burch, Smartwool's product line manager for apparel. "Using hemp helps us reach that goal."

The exhibit, "Sonic Succulents: Plant Sounds and Vibrations," is the artist Adrienne Adar's vision come to life.

Adar is a sound artist based in Los Angeles. She's passionate about the natural world and says her goal is to show people that plants aren't that different from us: They grow, breathe and even communicate in their own ways.

And so, back in May, she planted a patch of corn within the Brooklyn Botanic Garden and has surrounded it with large yellow megaphones that visitors can stick their heads inside to listen to what a growing stalk sounds like. It turns out the sound is almost extraterrestrial.

"It can be a little bit meditational ... children were sitting on the ground and putting their heads in the lower horns and just hanging out," she said.

This isn't the first time Adar has used her art to explore the sounds of nature. In 2016, she connected listening stations to trees around the New Mexico city of Taos for an exhibit designed to allow locals to experience the area's native trees and plants in a new way.

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2020 SEB Meeting

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Preliminary Timetable

Sat May 30th /Sun 31st	SEB & ISE Council Meetings
Sun May 31st	Opening Ceremony—UWI Campus
Mon June 1st	Conference
Tues 2nd	Fieldtrips
Wed 3rd	Conference
Thurs 4th	Conference, Banquet, and Awards Ceremony
Fri 5th/Sat 6th	Optional Two-Day Post Conference Fieldtrip

12 symposium themes organized according to 7 of the 17 United Nations Sustainable Development Goals.

	Theme 1: Cannabis: From traditional to medicinal applications
	Theme 2: Economic botany & commercialization
	Theme 3: Ethnocuisines
	Theme 4: Agrobiodiversity & food security
	Theme 5: Primary healthcare and the role of ethno-medicine: Challenges & opportunities
	Theme 6: Botanical gardens & green spaces
	Theme 7: Spirituality, well-being & quality of life
	Theme 8: Climate change: The implications
	Theme 9: Ethno-aquatic resources
	Theme 10: Caribbean ethnobotany
	Theme 11: Biodiversity conservation
	Theme 12: Intellectual Property Rights (IPRs)

Fieldtrips

A number of fieldtrips are planned; details and prices will be sent out soon.



Field Trip 1

Blue and John Crow Mountains

- Hollywell National Park guided trails
- Blue mountain coffee plantation tour
- Picnic lunch at 3,000 ft. with some of the most breath-taking views on the island



Field Trip 2

Palisadoes & Port Royal

- Morning visit to the Palisadoes mangrove re-planting project and exploration of sand dune ecology (including a number of endemic species)
- Afternoon tour of UWI Life Science's Marine Laboratory
- Fresh fish lunch in historic Port Royal



Field Trip 3

Maroon Community & Castleton Botanical Garden

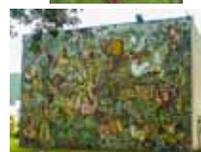
- Morning—visit to Charles Town Maroon community with lunch and traditional herbal “bush” tour
- Afternoon—Castleton Botanical Garden (<http://castletongarden.com>)



Field Trip 4

University of the West Indies guided tour and visit to Hope Botanical Gardens

- Morning—guided tour of the campus including the herbarium, botanical gardens, and historic and cultural landmarks
- Afternoon—guided tour of Hope Botanical Gardens & picnic lunch
- Ideal for those who don't want to travel far



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2020 SEB Meeting

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Location

The conference is to be hosted at The University of the West Indies (UWI), Mona Campus, Kingston, Jamaica

Airports

Jamaica is served by two international airports. Norman Manley International Airport is the closest to the conference, located approximately 40 minutes from the UWI campus. Delegates with flights into Sangster International Airport, Montego Bay, are served by an efficient and comfortable coach service (www.knutfordexpress.com). Coaches run to Kingston from 5.00am to 7.00pm, 9 times a day, 7 days a week, with journey times of approximately 4 hours.

Accommodations

Student Halls of Residence

Rooms (single or double occupancy) will be available at a cost of approximately US\$30-\$40 per night per person inclusive of linen. Shared bathrooms. Breakfast may be included. The conference coordinators are finalizing plans. (<https://www.youtube.com/watch?v=HXCPqqm7aDU&feature=youtu.be>).

Booking and payment details to be announced shortly.

Mona Visitors Lodge

(<http://www.monavisitorslodge.com/>)

Single occupancy available for US\$115 per night and double occupancy for \$140 per night, including breakfast.

A wide range of hotels are available within 15-30 minutes of the UWI campus in the price range US\$104 - \$318 inclusive of wi-fi, breakfast, and taxes.

In addition, a wide variety of rental properties and rooms are available through Airbnb and Booking.com within 5-15 minutes of campus in the price range of US\$25-\$150 per night.



University of the West Indies, Mona Campus



UWI Student Housing



Mona Visitors Lodge



Jasmine Inn

Ethnobotanews

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Do Plants Have Something to Say?

One Scientist is Definitely Listening:

Dr. Monica Gagliano, All Ears in Central Park.

The New York Times

By Ellie Shechet

Published Aug. 26, 2019, Updated Aug. 28, 2019

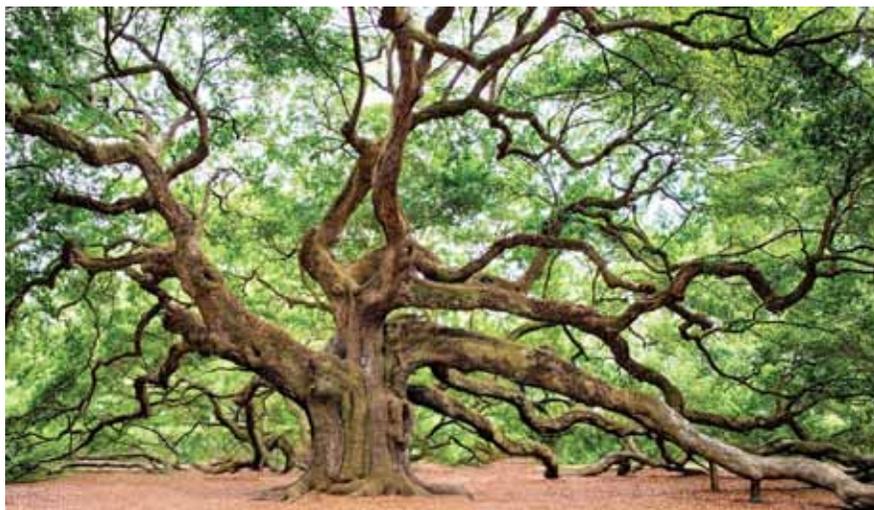
Monica Gagliano says that she has received Yoda-like advice from trees and shrubbery. She recalls being rocked like a baby by the spirit of a fern. She has ridden on the back of an invisible bear conjured by an osha root. She once accidentally bent space and time while playing the ocarina, an ancient wind instrument, in a redwood forest. “Oryngham,” she says, means “thank you” in plant language. These interactions have taken place in dreams, visions, songs and telekinetic interactions, sometimes with the help of shamans or ayahuasca.

This has all gone on around the same time as Dr. Gagliano’s scientific research, which has broken boundaries in the field of plant behavior and signaling. Currently at the University of Sydney in Australia, she has published a number of studies that support the view that plants are, to some extent, intelligent. Her experiments suggest that they can learn behaviors and remember them. Her work also suggests that plants can “hear” running water and even produce clicking noises, perhaps to communicate.

Plants have directly shaped her experiments and career path. In 2012, she says, an oak tree assured her that a risky grant application—proposing research on sound communication in plants—would be successful. “You are here to tell our stories,” the tree told her. “These experiences are not like, ‘Oh you’re a weirdo, this is happening just to you,’” Dr. Gagliano said. Learning from plants, she said, is a long-documented ceremonial practice (if not one typically endorsed by scientists).



Photograph Credit: George Etheredge for The New York Times



The Schultes Storybook

Submitted by Mark Plotkin, PhD.
 mplotkin@amazonteam.org

The Schultes Storybook Map employs a novel form of digital storytelling to share the life and times of Richard Schultes, one of the most remarkable ethnobotanists who ever had the honor and pleasure to study indigenous peoples and their plants. The map details Schultes' journey from a penniless scholarship student at Harvard to groundbreaking studies of the Kiowa peoples and their peyote in Oklahoma to the Mazatec shamans and their magic mushrooms in Oaxaca to a decade-long stint in the northwest Amazon in search of ayahuasca.

The map should be seen and enjoyed on a LAPTOP—handheld devices cannot do it justice. The map is accompanied by lectures at Harvard by Brian Hettler - the cartographer - as well as ethnobotanist Mark Plotkin, a former Schultes student. The two lectures serve to better explain how to use the map as well as to better explain Schultes' pioneering role in 20th century ethnobotany.

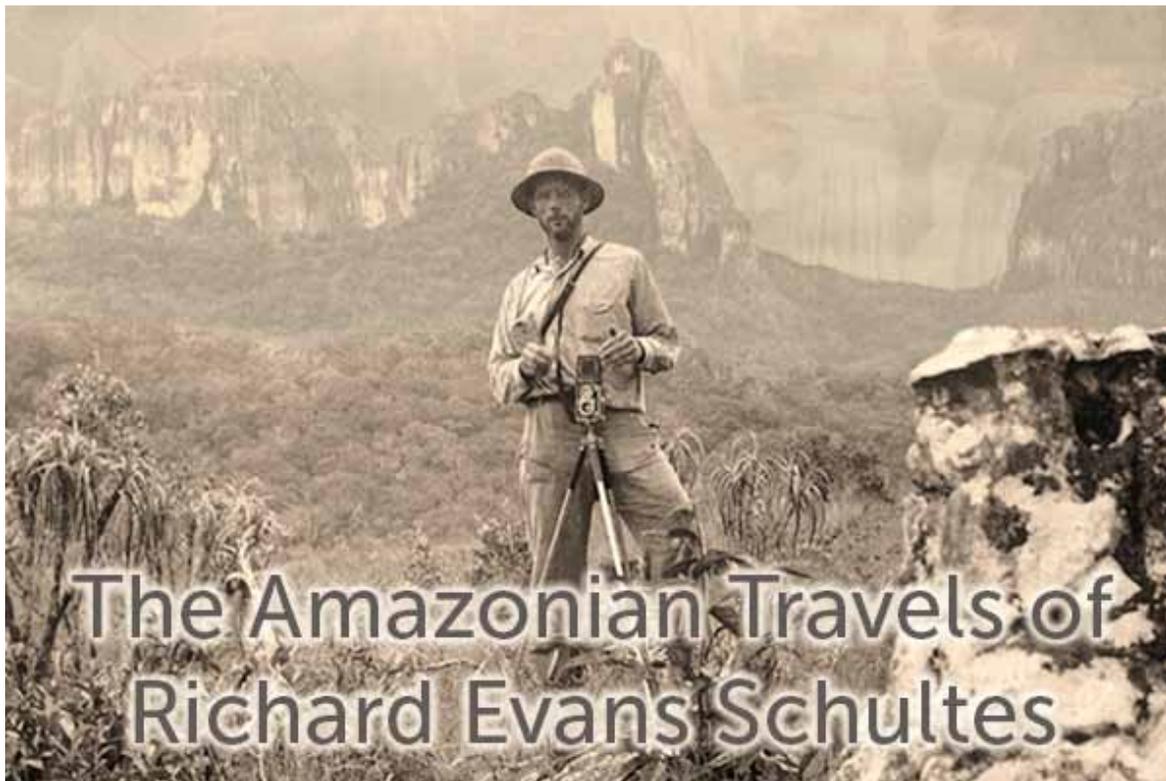
You can experience this yourself by going to: <https://www.amazonteam.org/storytelling-maps/> or watch a lecture. It is marvelous.

<https://hmn.harvard.edu/event/amazonian-travels-richard-evans-schultes>

Lectures

Mark Plotkin—Co-Founder and President of the Amazon Conservation Team
 Brian Hettler—GIS and New Technologies Manager of the Amazon Conservation Team
 With an Introduction by Neil Schultes

Richard Evans Schultes—ethnobotanist, taxonomist, writer, photographer, and Harvard professor—is regarded as one of the most important plant explorers of the twentieth century. In 1941, Schultes traveled to the Amazon rainforest on a mission to study how Indigenous peoples used plants for medicinal, ritual, and practical purposes. A new interactive online map, produced by the Amazon Conservation Team, traces the



landscapes and cultures that Schultes explored in the Colombian Amazon. Plotkin and Hettler will share this map and discuss the relevance of Schultes' travels and collections for science, conservation, and education in the twenty-first century.

A recording of this program will be available on the HMSC Lecture Videos page .

I watched this lecture and it is a wonderful project honoring Schultes. It is totally interactive with so many details.
 —Trish



Publications

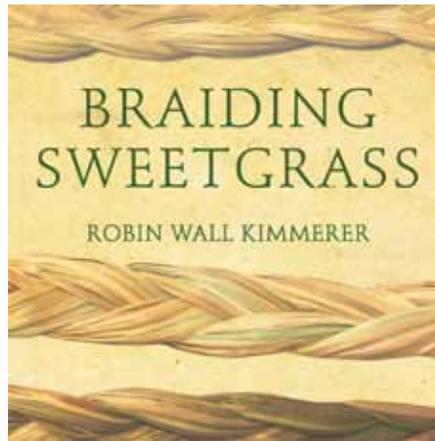
Sunshine Liberty Brosi
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Braiding Sweetgrass

By Robin Wall Kimmerer (Milkweed Editions, Minneapolis, MN 2013)
 \$13.97, paper. ISBN 1571313354, 391 pp.

Braiding Sweetgrass is an artfully written nonfiction book focusing on shifting our cultural values and worldview for a more mindful environmental ethic. Kimmerer is a gifted writer, an enrolled member of the Citizen Potawatomi Nation, a thoughtful botanist and ecologist, and a skilled teacher. The book is set both in the sugar maple groves of rural New York and the deep Appalachian hollers of Kentucky and includes references to the land and the people who lead to her ethos of “The Honorable Harvest.” Her description of “Becoming Indigenous to a Place” focuses on knowing who supplies your food, which mirrors themes in Wendell Berry’s writings. *Braiding Sweetgrass* focuses on finding commonality instead of duality between Indigenous knowledge, such as Three Sisters Farming and scientific theories, to reframe our places as people who are part of the environment. Her creative writing style describes Nancy Turner and Cat Anderson’s theories in a way that engages the reader to understand Traditional Ecological Knowledge. She is clear that the close friendship with an older Appalachian woman, Hazel, had a huge influence on developing the ethos she promotes. The description of witch hazel shrubs is one that will stick with me this October as they brighten up the Appalachian fall. Hazel’s need for regular visits to the family homestead in Kentucky reminds me of many Appalachian authors, and allows Kimmerer to accept her need to come home to the sugar maple woods where she was raised, a luxury that few academics have the ability to achieve. Her reflections on the various values and students from Kentucky to New York are insightful for those of us with classroom experiences in a range of academic institutions and allow us to reflect on expectations of ourselves. Her fieldtrip to the Great Smoky Mountains is particularly enjoyable to read in order to contemplate what we are teaching and why. Readers will delight in hearing details of Native American linguistics, basketry and other arts, and the joy of dirt below your fingernails. The book delightfully and authentically chronicles the author’s growth as a college professor, adventures in being a single mother, and transition into an empty nest. *Braiding Sweetgrass* neither falls into the trap of preachy, new-age, bring your own grocery bags to the store type of environmental movement writing nor the flowing optimism of pure nature writing. After each chapter the reader is compelled to become involved in local politics,

clean up a nearby creek, learn a new language, and take time to appreciate the natural world in a new way. Through creation stories and details of sustainable traditional ecological management of Native Americans, Kimmerer challenges the European immigrant ecological consciousness by asking us to invest and settle into America. Kimmerer occasionally gets caught in some weeds, particularly the thick cattails of ponds, and includes botanical details that non-ecologist readers may feel compelled to skip. This book would delight my colleagues. The nearly 400-page book is not a summer beach read, but will engage readers as the days grow shorter and it is the perfect book to read next to the fire during the upcoming long winter night—start today because you will want to finish before the new year.



I also read this book and support all Sunshine has said, but there is more I want to add that I found of value. I applaud Kimmerer’s constant demonstration of gratitude to people and places and her attention to the responsibility of being a part of a community, any community in which we all live. What do we do as responsible members of a community? She poses that. I find the answers to that question important to contemplate these days. She also states that few people really look at nature. She states that scientists are some of those few, but that we lack something: what we lack (in her mind) is spirituality. It may be true, as many do not practice spirituality, but as Ethnobotanists, many of us have that sensitivity and we need to make that indelible.

Trish Flaster, Editor.



Movies

Movie Night in Cincinnati
 Submitted by *Giulia Mattalia*
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On the second night of the annual meeting of the Society for Economic Botany, 2019, two movies were shown. The first movie, first viewed at our annual meeting in Kentucky, “A Force for Nature: Lucy Braun,” is the biography of E. Lucy Braun, one of the first women ecologists. She was born in Cincinnati and she was the third woman ever to receive a Ph.D. at the University of Cincinnati, where the annual meeting was held. I believe it is a very inspiring movie that can be watched by our students to learn from such a bright example of devotion to science, research, and nature conservation.

The second movie, titled “Trees in Trouble: Saving America’s Urban Forests,” has been recently produced by Andrea Torrice. The movie starts from the catastrophic effect of a tiny insect, the Emerald Ash Borer, which killed thousands of ash trees in the area of Cincinnati, as well as in 37 other states across the country substantially faster than predicted. *Agrilus planipennis*, an insect native to Asia, appeared for the first time in Detroit almost 20 years ago. However, the case of Cincinnati is quite emblematic, given that 39% of the city is covered by forest. This movie tells not only the story of an ecological disaster, but also its impact on this community in Ohio. Indeed, this event affected the city from various perspectives: city ash trees are crucial for public health as “you cannot find anything that costs so little and continue to have so much value to communities.”

The appearance of the Emerald Ash Borer had a huge cost for the municipality of Cincinnati, which could not immediately replant the thousands of felled trees due to exorbitant unexpected costs (up to \$1,000 to remove a single tree). Therefore, the community organized and volunteers were engaged to replant the trees, and in doing so obtained not only a greener future for the city, but also a greater awareness among young participants. One declared, “The reason we are planting trees is to increase the biodiversity of our forests.” To reintroduce ash species into the wild may take decades, but the take-home message of this movie is how Cincinnati inhabitants recognized the inestimable value of city trees and created partnerships among scientists, citizens, and city administrations to find solutions to take urgent actions for preserving the urban forests for the next generations of citizens.



Reflections on Teaching Wild Plant Foraging

Submitted by Lytton John Musselman

I have been interested in edible wild plants my entire life, starting with family outings in southern Wisconsin collecting walnuts, hickories, raspberries, blackberries, and grapes. My parents collected these for family food but they made foraging enjoyable. I always felt I never really knew or understood a plant unless I was aware how it was used, especially for food. This prompted a lifetime pursuing edible wild plants and teaching about them in a variety of venues.

My field botany courses in Wisconsin, North Carolina, Michigan, New York, and Virginia were for university students, the general public, and military trainees. My wife and I wrote the edible plants portion of a U.S. Army survival manual that required a selection of plants that are readily found and not confused with toxic plants. In addition to these domestic courses, I also had the privilege of teaching students field botany as a Visiting Professor in Sudan, Palestinian Territories, Jordan, Lebanon, Syria, Iraq, and Brunei Darussalam.



Sassafras albidum

I have also been the botanist on Prairie Home Companion cruises for excursions and lectures. There is still a lot to learn.

After munching my way through deciduous forests, coastal marshes, tall grass prairies, deserts, steppes, alpine meadows, rain forests, parking lots, cemeteries, and other plant communities (usually with

students in tow) made me think—What would I share with teachers for a course in edible plants? What are the components of such a course? What is to be emphasized? To my knowledge, there are no textbooks or guides for an edible plants course, probably because each must be tailored to a specific region. What follows are my reflections, admittedly inchoate and unabashedly personal, on teaching edible wild plants—to be sure with a southern bias.

Is Foraging Science?

The study of edible wild plants is often a component of ethnobotany courses and less frequently anthropology courses. Is it a science? Natural history? Unlike other plant sciences such as genomics or biochemistry, much of the literature on harvesting edible plants, generally known as foraging, is from non-scientists. This does not mean the information is unreliable, but that it has less dependence on primary literature and often has a folklore aspect. Edible plant courses, by their very nature, require an intimate familiarity with the local flora, including the ability to determine species at the non-flowering and non-fruiting

stages when plants lack features for identification. Many naturalists provide this useful information through their writing and teaching.

Components of an Edible Plants Course

In my edible plant or field ethnobotany classes, I include dyes, cordage, cordials, teas, and paper made from native plants, as well as herbal remedies,

cultic plants, mushrooms, and tree semiotics. Here I only deal with foraging edible plants and some of their products.

Starch Rules

Long-term survival in the wild depends on finding starch sources, which is why acquiring starchy plants is often a major emphasis of foraging classes and mandatory in survival manuals. In any given region, there is a limited number of substantial starch plants. Greens, on the other hand, are readily collected from many different deciduous trees as well as herbaceous plants. In my semester course, the emphasis is usually on starch, greens, and fruits. Not every food type can be included. For example, students are fascinated with the preparation of syrup from non-traditional sources such as walnut, birch, and other trees. This is a challenge in the South without the requisite warmer days and cooler nights for the rising sap.

Seasonings

Like natural sweeteners, there is a paucity of wild plants for seasoning. The young shoots of sassafras, *Sassafras albidum* (Lauraceae) provide file only in the early spring. Dried leaves of the related red bay, *Persea borbonia* (Lauraceae), are a good substitute for bay leaf, *Laurus nobilis* (also Lauraceae), and are available in any season. Ramps, *Allium tricoccum* (Alliaceae), and other members of the genus are flavorful condiments. But in the Southeast, there are few additional plants to use as substitutes for spices.

Teas and Alcohol

Virtually any non-toxic leaf or bark can be made into a tea. My enthusiasm knows bounds for these brews. Fermented alcoholic preparations, however, are always interesting to students. For the U.S. Army survival manual, alcoholic products were proscribed because of possible dehydration under field conditions. Most undergraduates don't face that challenge.

Don't Eat What You Don't Know.

If I ingested poisonous plants in my extensive grazing, the toxins were slow acting or a sub-lethal dosage. But poisoning happens, even to plant scientists. I know of a botanist from the north-eastern United States who, on a class field trip in the Panhandle of Florida, pointed out a fig that he promptly ate. After a visit to an ER that he learned it was not a fig but the fruit of the tung oil tree (*Vernicia fordii*, Euphorbiaceae) well documented for its toxicity. He lived to tell the story.

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Reflections...

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On the other hand, some plants assumed to be poisonous are actually edible. For many years, I taught that black nightshade, *Solanum nigrum* (Solanaceae), was toxic. It is even figured on the cover of Hardin and Arena's Human Poisoning from Native and Cultivated Plants. So imagine my surprise at a conference in Tanzania where black nightshade was promoted as one of the most nutrient-rich plants for smallholder farmers. It is also delicious. Turns out this edible nightshade is part of what equivocating taxonomists call a "species complex" with numerous taxa of either varying gustatory value or mild toxicity.

I always begin my edible plant courses requiring recognition of toxic plants, especially those that can be confused with edible plants. In short, everything (EVERYTHING) depends upon proper identification.

Edible is not Palatable

Be certain to distinguish between these criteria. I have been fascinated with the Kentucky coffee tree, *Gymnocladus dioica* (Caesalpinoideae, Fabaceae) since seeing it in northern Illinois in my first botany class. In fact, it is more common in Illinois and the central Midwest than its eponymous state where its range is limited. The edible plant literature is replete with descriptions of coffee preparation from this tree. I roasted (to denature the reported heat-labile toxin) and ground the refractory seeds, brewed a cup and for once wished a Starbucks was nearby. There are references to the seeds being eaten like chestnuts. Yet the seeds are so hard they would be devastating to dentures if eaten like a chestnut. Mastodons have been suggested as dispersers of the tree. It would take mastodon molars to crush the seeds!

The second example are the buds and flowers of the common waterlily, *Nymphaea odorata*

(Nymphaeaceae), reported in many guides as consumable. Based on this, my Field Ethnobotany class at Cranberry Lake Biological Station in the Adirondacks collected a partial canoe load of buds. We tried them raw. Extremely bitter. We boiled them. Extremely bitter. We soaked them in wood ashes. Extremely bitter. After these trials the students themselves were getting bitter, so I gave up. Back home in Virginia, I tried again with local plants. Extremely bitter.

The repetition of such plant lore, though erroneous, is often unquestionably repeated, frequently for generations. Are edible plant enthusiasts especially culpable of uncritically repeating information from generations past as the Kentucky coffee tree and waterlily sagas suggest? Bottom line—be critical of what is described as edible.

It's Edible and Poisonous

Students are often surprised to learn plants can have both edible and toxic parts on the same plant. An example used in ethnobotany classes is rhubarb, *Rheum x cultorum* (Polygonaceae). The petiole is valued (at least by Yankees) for its tart flavor, but the leaf blade is toxic and responsible for deaths in Britain. A more dramatic example is ackee, (*Blighia sapida*, Sapindaceae), a tree native to tropical West Africa and brought to Jamaica where it is a national dish. The white aril of the ripe seed is edible with a buttery consistency and mild flavor, but the unripe seed is toxic and even fatal.

There are several examples of Southern plants with both edible and toxic parts. Paw paw, (*Asimina triloba*, Annonaceae) has luscious (usually, see below) fruits but other parts of the plant contain serious toxins. A less toxic example are ground cherries, native species of *Physalis* (Solanaceae) with edible fruits surrounded by a poisonous calyx.

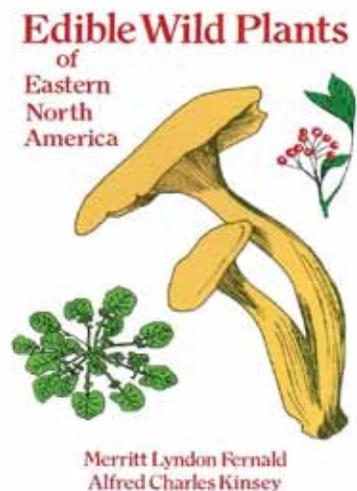
Wild Plants Vary Wildly

When teaching foraging, it is essential to note that wild plants are not subject to artificial selection contra our major food crops, such as grains with their thousands of years of selection. Native plants can vary greatly in phenology, size, and flavor. They also can have varying amounts of bitter tannins and oxalates. For example, the flavor and sweetness of the pawpaw fruits varies from plant to plant. This is why it is desirable to collect from numerous individuals in a population to garner the full suite of flavors. When harvesting mulberries, (*Morus alba*, Moraceae) I collect from

a diversity of trees for the complete complement of flavors of that fruit. Likewise, the stem tips of greenbriers, *Smilax* species (Smilacaceae), can have an asparagus-like flavor or be as bitter as a cheap merlot.

How Do We Learn Which Plants Are Edible?

I depend on experienced foragers and literature to learn edible wild plants. The literature is vast and the number of books on the subject is increasing. I note a few below: a comprehensive listing and review of available books would be a tome.



A dated but comprehensive treatment is Fernald and Kinsey's *Edible Wild Plants of Eastern North America*, first published in 1943. I still use this classic, which has gone through several revisions. It has an authenticity about it, a feeling the authors actually ate the plants and honestly describe the taste. These authors and their contemporaries mainly used the words "edible plants" in the title, while the newer, more yuppified volumes favor the word "foraging." Perhaps this is good: a more inclusive, more millennial term to embrace a wider community than just botanists. Or perhaps it is reflective of a return to local foods, part of the locavore movement—selecting foods deemed healthier because they are collected in nature (but see comments under Harvesting Wild Plants).

For those of us working in North America, a valuable source of information is the ethnobotanical studies of Native Americans, people who actually did live off the land. These researches provide exhaustive data on useful plants, uses often little-known today. There are numerous treatments I utilize: I list a few examples. The work of Nancy



Nymphaea odorata

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Turner with First Nation peoples in Western Canada is classic ethnobotany and I used it for fieldtrips in southeastern Alaska. The review by Moerman (*Native American Ethnobotany*) is a very helpful compendium of the literature arranged by plant species. There are similar resources for indigenous peoples in other parts of the world, fertile pastures for edible plant grazing but often not in English.

A web resource I value is Plants for a Future (<https://pfaf.org>), which has a series of online bulletins on an amazing array of plants—each treatment includes edibility, when appropriate, among other uses. While there is a temperate bias, the scope of PFAF is global. Today's students have ready access to immense databases like this and many other web resources and therefore depend less on the printed page.

Botanical Kinship

Another way to learn new edible plants is to find edible kin in other parts of the world. Here are two examples. The first was my discovery that a plant promoted by the World Vegetable Center in Arusha, Tanzania because it is “nutrient dense” is *Cnidioscolus aconitifolius* (Euphorbiaceae). This conflicted with my understanding of the genus represented by *C. stimulosus*, a local stinging nettle I assumed was toxic, like many members of this family. Gingerly—because of the stinging hairs—it was collected and steamed. Tasty. The seeds, though small, have a nut-like flavor.

The second example was from a visit to the labyrinthine market in Miri, Malaysia, where one of the warrens sold greens including *Alternanthera sessilis* (Amaranthaceae). Did this mean that alligator weed, *A. philoxeroides*, an invasive clogging canals in the southeastern United States, was edible? I tried steaming some and it was good.

Crop relatives may also lead to new usages. *Digitaria exilis* (fonio), *Eleusine coracana* (finger millet), and *Paspalum scrobiculatum* (kodo millet) are referred to as minor millets because of their limited

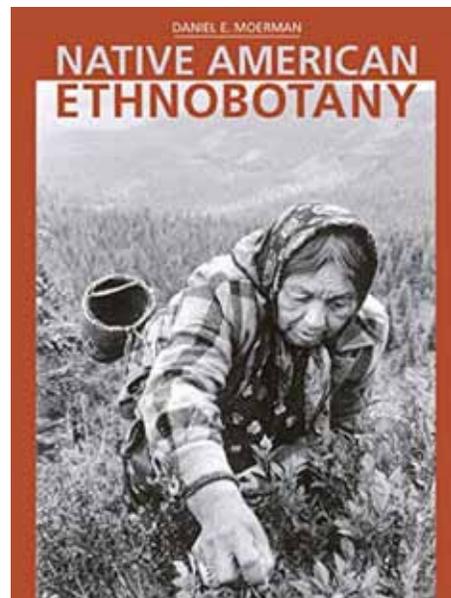
use, but they are important subsistence crops in restricted areas, especially in the semi-arid tropics. Are their usually weedy representatives in our flora—*Digitaria sanguinalis* (crabgrass), *Eleusine indica* (goose grass), and *Paspalum* spp. (dallis grasses)—worth foraging? The proverbial further research is needed.

Living Off the Land

Many years ago, I was visited at unpredictable intervals by an interesting character convinced of a coming apocalypse devastating food supplies and requiring dependence on wild plants for survival. He carried tattered three-ring binders of plant pictures for me to verify as edible. His visits became fewer and fewer and I have not seen Richard for two decades, an absence I hope is not due to poisoning. Richard is an extreme case of “living off the land.” He would certainly endorse *The Official Pocket Edible Plant Survival Manual: A Life Saving Manual Needed by Every American To Combat National Emergencies Caused by Terrorists or Otherwise*, by Robert W. Pelton. While there are relatively few survivalists like Richard, there are numerous serious foragers.

A proponent of earnest wild plant sustenance is fellow Wisconsinite Samuel Thayer, whose foraging techniques are explicated in a series of books including *The Forager's Harvest: A Guide to Identifying, Harvesting, and Preparing Edible Wild Plants*. Thayer's book belongs to the genre of work that takes wild plants as a source of quotidian food. He includes a lot of material about large quantities of food that usually require specialized equipment. If you are

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earnest about using wild plants for serious food, I recommend this book.

Native Americans

When it comes to living off the land, we are fortunate to have considerable data from people who were true hunter gatherers—Native Americans. Anyone doing this for even a few days will be thankful for the Columbian Exchange that has shaped our food supply.

One reason reproducing authentic Native American recipes is difficult is they often require non-vegetal components. For example, most foraging books do not include collecting fat from buffaloes and ground hogs. In my Field Ethnobotany course at Mountain Lake Biological Station, students harvested rhizomes of cattail (*Typha latifolia*, Typhaceae). I explained that Native Americans

and fat. In short, our native plant recipes seldom resemble food preparation for those who had to live off the land.

Some recipes use the plants only to augment a concoction requiring butter, cream, flour, sherry, sugar, and other components with the wild part only an adjunct. No wonder the foraged plant tastes good with these rich, overwhelming flavors! The plain truth is that wild plants taste different from our usual diet and the difference is not always perceived as pleasant, a difference usually surprising to students. For me, being an authentic forager requires preparation that displays the dominant flavor of the wild plant(s).

Toxins and Allergies

The most important criterion for foraging is a love of nature and a passion for plants. Also required is



likely would cook these in buffalo fat, which the class lacked until one student brought fat from a buffalo butchery in his town. The fried medallions of cattail rhizome were delicious. This raises the question of what other native plant preparations would taste like if recipes used wild animal meat

a temerity for tasting new and different things but avoiding allergies. However, caution is prudent. It is essential to warn of toxic plants and to inform students of the need for accurate determination. But allergies also need to be considered as I learned when demonstrating wintergreen, *Gaultheria*



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procumbens (Ericaceae), and asked a student to try it and identify the taste. He did and immediately spit it out because of a strong allergy to aspirin and salicylic acid. Ingestion of even a small dose could be serious.

Sustainably Harvesting Wild Plants

Just because a plant is growing in the wild and is edible does not mean it should be ingested. Numerous plants can accumulate heavy metals and sequester herbicides. Therefore, I hesitate to collect from roadside ditches and near golf courses. Agricultural fields can have copious amounts of *Amaranthus* and *Chenopodium*, both desirable for both their greens and seeds, but the agricultural soils are often drenched in pesticides and high in nitrogen. The soil should be as healthy as the plant.

I include discussions of survival plants in my classes, those that are widespread and can be gathered any season, and I emphasize cattails and pine trees. But present-day foraging is rarely for survival. Accordingly, populations of plants should not be destroyed just to provide an exotic meal. This is especially true for plants producing tubers or corms. For example, species of *Claytonia* (spring beauty, Montiaceae) yield a very tasty tuber but harvesting destroys the plant. On the other hand, groundnut, *Apios americana* (Fabaceae), also has tasty tubers but older plants have several tuber-laden rhizomes enabling harvest without decimation. Be discriminate in what is taken from nature.

We need to teach students to practice sustainable collection by showing the impacts of over-harvest of such desirables as ginseng and ramps, a downside of the “locavore” trend, e.g., ramps in every Brooklyn hipster pizzeria. A good example of sustainability is the Cherokee way of harvesting ramps in which only leafy tops are cut, leaving the bulb to produce a crop the next year.

Acknowledgements

If I thanked everyone who taught me, helped me, worked with me, field tripped, and gaged with me the past five decades, the list would be as long as this essay. I am grateful to them all. Three contemporaries who are recognized teachers of field botany—Jay Bolin, Nick Flanders, Peter Schafran—read and improved drafts of this work. I am thankful for their help. The future of edible plant studies depends on such young scientists with their dedication and enthusiasm—and temerity.

Parts of this essay will be in a forthcoming book *Edible Wild Plants of the Carolinas: A Forager's Guide* by Lytton J. Musselman and Peter W. Schafran to be published by University of North Carolina Press as part of their Southern Gateways Guide series.



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From the Biomimicry Institute Newsletter

August 7, 2019

Full reports are available on their website, biomimicry.org

The following is a letter from the Biomimicry Institute's Executive Director, Beth Rattner, in our newly released Annual Report.

Over the last two years, we have refined our strategic vision around the core question of impact. Impact is tricky to measure when you are talking about a practice, a paradigm shift, a movement. How quickly can we expect the world to look different because of our efforts?

So we asked ourselves: how do we reach the people who make our homes, our energy systems, our rainproof jackets, our blue jeans? We landed on an approach that reaches people across a continuum of learning—from being a middle-school student through an early-stage start-up.

ACCESS

By offering free tools and resources like AskNature and our Biomimicry Toolbox, we provide open access to learning biomimicry.

PRACTICE

By creating opportunities to practice biomimicry in action via design challenges like our Youth Design Challenge and the Biomimicry Global Design Challenge, we provide the platform for students and educators to learn and teach with a nature-inspired lens.

CULTURE SHIFT

By providing a pathway to entrepreneurship for early-stage biomimetic innovations with our Launchpad program, we work to bring about a culture shift toward seeing biomimicry as a reflex.

What's less quantifiable is the way people become transformed by their exposure to biomimicry—those who no longer can or want to design in a disposable way.

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