



**SEB
ISE**

Guaiacum officinale L.

JAMAICA 2022

29 May - 2 June 2022 @ The UWI, Mona

PROGRAM & ABSTRACT BOOK

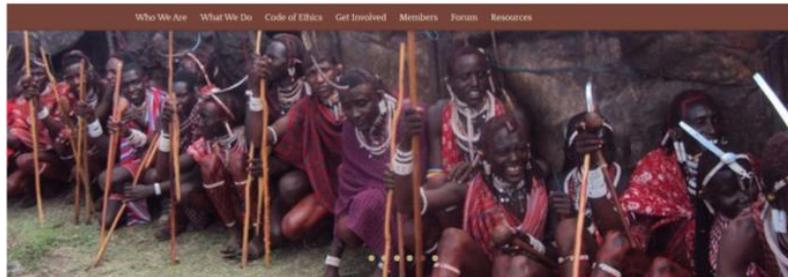


Society for Economic Botany (SEB)



The SEB is about plants and human affairs, people exploring the uses of, and our relationship with plants, cultures and our environment. Our research and educational efforts may well be called the *science of survival*

International Society of Ethnobiology (ISE)



The ISE is an alliance for biocultural diversity, a global, collaborative network of individuals and organizations working to preserve vital links between human societies and the natural world



#SEBISE2022 Jamaica Conference @ The UWI Mona
Out of Many, One People: Biocultural Diversity Across Borders

12 Symposium Themes

29 May - 2 June, 2022

Organized according to 8 of the 17 UN Sustainable Development Goals





THE UNIVERSITY OF THE WEST INDIES AT MONA, JAMAICA

The UWI is the region's premier tertiary level institution with 70 plus years of excellence in teaching and research. This was recently recognized in the UK's Times Higher Education University Ranking where we were rated the Caribbean's #1, in Latin America's top 2% and among the World's top 4%. The Mona Campus in Jamaica is the largest of the five UWI campuses with seven faculties spread across 653 acres. Our campus is host to over 19,000 students pursuing studies in the Humanities and Education, Social Sciences, Medical Sciences, Law, Engineering, Science and Technology and Sport. Our students, at the undergraduate and graduate level, receive the highest level of training from faculty who are leaders in their various disciplines. With over 1,600 faculty and 1,400 administrators, students are guaranteed the highest rates of success. To date, The UWI boasts among its alumni 18 current and former Caribbean heads of government.

#SEBISE2022 Organizing Committee



Dr. David Picking
Research Fellow
Natural Products Institute
(Chair)



Dr. Ina Vandebroek
Senior Lecturer
Department of Life Sciences



Prof. Rupika Delgoda
Executive Director
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Dr. Machel Emanuel
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Department of Life Sciences



Dr. Fred Boyd
Lecturer
Department of Life Sciences



Mrs. Stacey Aiken-Hemming
Nutritionist



Mr. Patrick Lewis
Herbarium Curator
Department of Life Sciences



Dr. Joseph Powell
Director
UWI Press



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Conference Shuttle Service

A bus will be available in the mornings to shuttle participants from 138 Student Living to the conference venue. The bus will return participants in the evening and be available throughout the day. The journey is approximately 5 minutes (or a 20-minute walk).

Pegasus Hotel to and from Campus

An early morning service will operate from the Pegasus hotel to the conference and return participants in the evening.

SOCIAL MEDIA



Be sure to follow us on **Twitter** and tweet during the meeting. Use the hashtag **#SEBISE2022** in your tweets to add to, or follow, the discussion about the meeting.



Follow the meeting on **Facebook** as well! The SEB/ISE Meeting has its own Facebook page <https://www.facebook.com/2022JamaicaEthnobiology>

SOCIETY FOR ECONOMIC BOTANY (SEB) CODE OF CONDUCT FOR MEETINGS AND OTHER FUNCTIONS

All members of the Society for Economic Botany (or attendees of the Society's functions) are required to follow the Society's Code of Conduct for Meetings. This includes, but is not limited to, any Society conference, other meeting, function, event, or professional activity. Behavior of the Society's members reflects on the reputation of the Society and should create a safe and professional atmosphere free of harassment, stalking, threats, abusive conduct, and bullying whether physical or verbal. Any member or attendee participating in these unwanted behaviors risk expulsion (without refund) from the event and the Society as well as further consequences including the involvement of local law enforcement.

Society members (and attendees of Society's functions) are expected to:

- Not harass another based on race, national origin, religion, gender, sexual orientation, gender identity or expression, civil union or marital status, age, citizenship status, disability, pregnancy, ancestry or medical condition.
- Not sexually harass another in the form of unwanted behavior of a sexual nature whether physical or verbal that includes, but is not limited to, unwelcome sexual advances or requests for sexual favors.
- Present research and statements on other cultures or individuals in a respectful manner. Critique presentations and research with a focus on the presentation and work, not on the individual.
- Not purposefully disrupt oral and poster presentations.
- Not record or transmit audio, video, or images of oral or poster presentations without author approval.
- Speak up if a member (or event attendee) has done or is doing something that is against the Society's Code of Conduct or Guidelines on Ethics and understand that retaliation for complaints will not be tolerated*.

*Report activity contrary to these codes by contacting a Society officer, starting with the president (contact information can be found on the society website or at the registration desk at meetings). Contact another society officer if the first attempt is unsuccessful. Understand that the first step will be two society officers approaching the accused and requesting the offending behavior to stop and that subsequent steps will be conducted as necessary. Know that confidentiality will be maintained if possible and that local police should be contacted for threats to public safety and criminal acts.

PROGRAM OVERVIEW

Check the SEB website regularly for an **up-to-date overview of the week** and details for each day: <https://www.econbot.org/home/meetings/economic-botany-2022/schedule-and-program.html> (click on week overview to enlarge the image). A more detailed schedule for Monday, Tuesday and Thursday with presenter names is also provided below. Fieldtrips are on Wednesday and will depart at 7 am from 138 Student Living on The UWI Mona Campus. Rise bright and early and full-joy Jamaica, as Jamaicans say!

EVENT LOCATION MAP AT FMS ON THE UWI, MONA CAMPUS

All symposia and workshops take place at the Faculty of Medical Sciences (FMS)



MONDAY SCHEDULE

MONDAY 30th May					
Event Location					
Start Time	Location 1	LT3	LT2	Location 4	
08:00	Registration at FMS (Outside LT2)	Exhibitor space (outside LT3 and LT2)			
08:15		In-person poster presenters: Please set up your posters on the allocated boards close to the registration desk.			
08:30		Opening Keynote Speaker: Tinde van Andel			
08:45		Location LT3 (8:30 - 9:15)			
09:00		Symposium Agrobiodiversity (Chair: John de Parra) (8:15 - 11:15)	John de la Parra: The Periodic Table of Food Initiative	Symposium Social Justice (Chair: Jim Hoyle) (8:15 - 11:15)	Jeffrey Wall: Getting Beyond Diversity: Evaluating Compatibility between Biodiversity and Indigenous Environmental Priorities in Mi'kma'ki (Nova Scotia)
09:30			Nicholaas Pinas: Unraveling vernacular names of Maroon rice varieties in Suriname and French Guiana		Guadalupe Maldonado: Investigating Ethnobotanical Abortions in Central Mexico during the Marea Verde
09:45			Alexa White: Participatory Sustainable Development and Sustainable Agriculture: A Case for Small-Scale Farms and Their Influence on Food Sovereignty		Christina Edwin & Itzel Zagal: Indigenous Food Systems Beyond Borders: Honoring Ancestors and Food Through Collaborative Community Projects
10:00			Ana Maria Garrido: <i>Musa</i> , Afro-descendants and Socio-Environmental Transformations: Livelihood Trajectories in Andagoya, Chocó, Colombia		Janelle Marie Baker: Boreal Food Sovereignty across Borders: The Creation of a Subarctic Centred Website
10:15			Ashley McGuigan: Ecological functional diversity predicts nutritional functional diversity in complex agroforests		Igor Pasternak: Talking Food in Odessa, Ukraine: A Tribute to My City in the Time of War
10:30			Emily Warschewsky: Tree crop diversity, conservation, and domestication		Giulia Mattalia: Centripetal political contexts can foster wild food plant knowledge homogenization
10:45			Gabriela Garcia: An integrated understanding of coffee alternate bearing and feedbacks with farmer decision-making across scales		Simon Hoyle: Forest spirits and smartphone apps: digitising biocultural heritage across Africa for indigenous rights and biodiversity revival
11:00			Nanci J. Ross: Sex in the orchard: wild variability in American Persimmon flowers		Ingrid Hall: Biocultural Rights, Indigenous Peoples and Local Communities Protecting Culture and the Environment
11:15		Coffee Break (11:15 - 11:30)			
11:30		Symposium Agrobiodiversity (Chair: Robert Bye) (11:30 - 12:45)	Robert Bye: Transformation of indigenous agrobiodiversity in southwestern North America during the 19th century	Symposium Cannabis (Chair: Maria Vitoria de Menezes) (11:30 - 12:45)	Mark Merlin: Back on the trail of archaeobotanical evidence for ancient psychoactive drug plant use in Eurasia
11:45			Adele Woodmansee: Native Maize and Climate Change: Drought and Seed Systems in San Miguel del Valle, Oaxaca, Mexico		James A Baum: What's in a name? Ruminations on Cannabis classification and nomenclature
12:00	Jose Tomas Ibarra: Territories with memory: biocultural networks and agrobiodiversity in the southern Andes		Bryan Embry: Conscience and Sustainable Cultivation of Cannabis		
12:15	Harriet Gendall: "Gather ye fragments that are left that nothing be lost": Insights for biocultural revitalisation from early-twentieth century Cornwall		Stacy B Schaefer: The Heart of the Emerald Triangle: Women in the Cannabis Industry		
12:30			Jed Justin Goodridge: Open field cultivation of Narrow-leaf drug vs. Broad-leaf drug cultivars of <i>Cannabis sativa</i> L. in Jamaica		
12:45	Lunch (1.5 hrs)			Student mentor lunch (1.5 hrs) Location: Courtyard in front of FMS	
13:00	Location: Courtyard in front of FMS (12:45 - 14:15)				
13:15	Keynote Speaker: Susan Otukon				
13:30	Location LT3 (14:15 - 15:00)				
13:45	Symposium Ethnobotany (Chair: Jim Penn) (15:00 - 16:30)	Ashley Glenn: The Bosnian pita in St. Louis, USA: inquiry of a dish as cultural keystone	Symposium Economic Botany and Equitable Commercialization (Chair: Jim Penn) (15:00 - 16:30)	Edelmira Linares: Diachronic comparison of medicinal plants sold in the Tianguis de Ozumba, State of Mexico, Mexico	
15:15		Gabriela Alejandra Olmos Rosas: Tortillas in the Snow		Sveta Yamin-Pasternak: Fire and Morchella: Ethnobotany of Morels in the Boreal Burn	
15:30		Allison K. Cruz: Stirring the Pot: Feeding Alaskan Sled Dogs		Jim Penn: Camu camu fruit harvests in Western Amazonia: Success and concerns for a long-term community resource management effort	
15:45		Molly Carney: Exploring the Archaeological Biographies and Plant Food Diversity of Western North American Food Preparation Features		Felipe Gutierrez: Social Innovation and entrepreneurship for biocultural conservation in the Amazonian-nut value chain, Brazil	
16:00		Lukasz Lucza: The Ethnobotany and Biogeography of an Archipelago: An Example of the Adriatic Islands		Ana Maria Garrido: Homogenization of public knowledge and uses of plants and fungi in urban environments: A case study survey from Colombia	
16:15		Thera Edwards: Beauty with a Purpose: The history and global significance of Cinchona Botanical Gardens, Jamaica			
16:30	Coffee Break (16:30 - 16:45)				
16:45	Social Justice Working Group Discussion				
17:00	ADIE (Alliance for Diversity, Equity and Inclusion in Ethnobiology) led by 3 societies: Society of Ethnobiology - SoE, Society for Economic Botany - SEB and International Society of Ethnobiology - ISE				
17:15	With participation from intersociety membership and allies				
17:30	Location LT3 (16:45 - 19:30)				
17:45	Open to the public				
18:00	All ARE WELCOME AND INVITED TO CONTRIBUTE TO THIS IMPORTANT DISCUSSION				
18:15	Cultural evening - Jamaican cinema, food, and drumming! Put on your dance shoes and your movie vibes!				
18:30	MOVIE: <i>The Harder They Come</i> (Starring Jimmy Cliff)				
18:45	Location: Courtyard in front of FMS (19:30 - 21:30)				
19:00					
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21:30					
21:45					
22:00					
22:15					
22:30	ACRONYMS FOR EVENT LOCATIONS AT FMS				
22:30	FMS: Faculty of Medical Sciences: LT2: Lecture Theatre 2; LT3: Lecture Theater 3; TR034-036: Workshop Rooms 034-036				

TUESDAY SCHEDULE

TUESDAY 31st May				
Event Location				
Start Time	Location 1	LT3	LT2	
08:00	Registration at FMS (Outside LT2)	Exhibitor space (outside LT3 and LT2)		
08:15		In-person poster presenters: Please set up your posters on the allocated boards close to the registration desk.		
08:30		Keynote Speaker: Sarah-Lan Mathez-Stiefel		
08:45		Location LT3		
09:00		(8:30 - 9:15)		
09:15		Symposium Caribbean Ethnobotany (Chair: Edward J. Kennedy) (9:15 - 11:15)	Ella Vardeman: Ethnopharmacology of medicinal plants for Caribbean women's health	Cassandra Quave: Emerging Technologies in the Ethnobotanical Approach to Drug Discovery
09:30			Fleur De Marie Fitzpatrick: Tracing migrant Maroon ethnobotany from farm to shop: a case study of revitalised knowledge transmission	Karsten Fatur: Tradition in flux: Changing ethnobotanical landscapes of anticholinergic Solanaceae plants in Europe
09:45			Kenneth Walker: Si No Hay Hierba, No Hay Religion (No Herbs, No Religion)	Murodbek Laldjebaev: Medicinal plants and health sovereignty in Badakhshan, Afghanistan: Diversity, stewardship, and gendered knowledge
10:00			Bradley Walters: The Greening of Saint Lucia	Fabien Schultz: Mysterious poisons and herbal remedies from medieval and early modern Germany
10:15			Rosalina Diaz: Decolonizing Paradise: A Radical Ethnography of Environmental Stewardship in the Caribbean	Anna Waldstein: Cleansing and Building in Rastafari Healing: Complex Herbal Mixtures in the Hostile Environment
10:30			Anthony Richards: Color symbolism and African continuities in Jamaican stories of the duppy Rolling Calf	Inken Dworak-Schultz: A video article: Transferring ethnopharmacological results back to traditional healers in rural indigenous communities in Uganda (26 min)
10:45		Anthony Richards: Assessment of bioprospecting and biopiracy in the Caribbean		
11:00				
11:15			Coffee Break (11:15 - 11:30)	
11:30		Symposium Climate Change (Chair: Morgan Ruelle) (11:15 - 12:45)	Morgan Ruelle: Ecological calendars for food sovereignty: The contributions of plant knowledge to climate adaptation	Maria Fadiman: "Grandma, Grandpa, Auntie, how do I use this?": Keeping ethnobotanical intergenerational knowledge alive, Tanzania
11:45			Babai Dániel: Local perceptions of environmental-biological changes driven by climate change	Rava Shelyn Chapman: The Black Plant Use Study: A Womanist Ethnobotanical Survey on Plant Cultivation, Care, and Well-Being
12:00			Julián Caviédes: Observations, drivers and adaptations to social-environmental changes in Important Agricultural Heritage Sites of southern South America	Zolia Nelson: Investigation of the Anti-hyperglycemic Effects of Anecdotally Hypoglycemic Plants in Normal Healthy Sprague-Dawley Rats
12:15			Dragana Dorđević & Jelena Brezjanovic: Socio-environmental risks of potential lithium mine in Jadar, Serbia	Carrie Waterman: Moringa: A Climate-Smart Crop for Improved Health, Nutrition, and Economic Resiliency
12:30			Mona Webber: Use of pelagic <i>Sargassum</i> spp. compost for soil amelioration in mangrove seedling production	
12:45		Lunch (1.5 hrs)		
13:00		Location: Courtyard in front of FMS		
13:15		(12:45 - 14:15)		
13:30	Keynote Speaker: Machel Emanuel			
13:45	Location LT3			
14:00	(14:15 - 15:00)			
14:15	1.5 h workshops (various locations)	Sonia Dhanda: CITES and plants: understanding wildlife trade policy (Location TR034)	Marc Williams: Botanical Beverage Fermentation, Formulation and Evaluation (Location TR035)	
14:30		Trish Flaster: Non Academic job opportunities (Location TR036)	Natty Mark Samuels: Grandmothers and Griot (Location LT2)	
14:45		Christina Horvath: Botanical Encounters: The use of arts-based methods to decolonise botanical imagination (Location LT3)		
15:00		Coffee Break (16:30 - 16:45)		
15:15	Cannabis panel discussion Location LT3 (16:45 - 18:15)	Moderator: Machel Emanuel	Marc Williams: Botanical Beverage Fermentation, Formulation and Evaluation (Location TR035)	
15:30		Panelist: K'adamawe Knife	Natty Mark Samuels: Grandmothers and Griot (Location LT2)	
15:45		Panelist: Annette Henry		
16:00		Panelist: Le Vaughn Flynn		
16:15	Panelist: Bryan Lee Emby			
16:30		Coffee Break (16:30 - 16:45)		
16:45		Second half of 3 h workshops (various locations) (CONTINUED)	Marc Williams: Botanical Beverage Fermentation, Formulation and Evaluation (Location TR035)	
17:00			Natty Mark Samuels: Grandmothers and Griot (Location LT2)	
17:15				
17:30				
17:45				
18:00				
18:15			Student networking workshop Location LT2 (18:15 - 19:15)	
18:30				
18:45				
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19:45				
20:00			Student Social Event Holy Smokes Bar & Grill (transport will be provided) (19:15 - 21:00)	
20:15				
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21:30				
21:45				
22:00				
22:15	ACRONYMS FOR EVENT LOCATIONS AT FMS			
22:30	FMS: Faculty of Medical Sciences; LT2: Lecture Theatre 2; LT3: Lecture Theater 3; TR034-036: Workshop Rooms 034-036			

THURSDAY SCHEDULE

THURSDAY 2nd June				
Event location				
Start Time	Location 1	LT3	LT2	
08:00	Registration at FMS (Outside LT2)	Exhibitor space and artisanal vendors (outside LT3 and LT2)		
08:15				
08:30		Keynote Speaker: Rupika Delgoda		
08:45		Location LT3 (8.30 - 9.15)		
09:00				
09:15				
09:30		Poster Judging Session (for both physical and virtual participants)		
09:45				
10:00		Location LT2 (9:15 - 11:15)		
10:15				
10:45				
11:00				
11:15		Coffee Break (11:15 - 11:30)		
11:30		Symposium Biodiversity Conservation (Chair: Susanne Masters) (11:30 - 12:45)	Susanne Masters: Modern Markets: evaluating orchid trade at technological frontiers	
11:45			Sonia Dhanda: Sustenance and sustainability: a review of the edible orchid trade	
12:00	Julia Douglas: The biocultural conservation of epiphytic orchids in Oaxaca, Mexico			
12:15	Viktor Ulicsni: Conflicts of economic and cultural origin between farmers and wild animal species in East Central Europe			
12:30	László Demeter: Domestic pigs living in forests and marshes: Traditional knowledge of pig keepers and impacts of pigs on vegetation in Southeast Europe			
12:45	Lunch (1.5 hours)			
13:00	Location: Courtyard in front of FMS			
13:15	(12:45 - 14:15 pm)			
13:30				
13:45				
14:00				
14:15	Other Symposium Themes Continued (Chair: Kim Walker) (14:15 - 15:45)	Kim Walker: The Botanical History of the Gin & Tonic	Other Symposium Themes Continued (Chair: Michael McLaughlin) (14:15 - 15:45)	
14:30		Fabien Schultz: Self-medication in wild chimpanzees and mountain gorillas - Local knowledge and pharmacological assessment		
14:45		Varpu Lotvonen: Reindeer lichen landscapes in Alaska		
15:00		Hank Stevens: Are Mayan garden forests just drifting away?		
15:15		Ibon Tobes Sesma: Ethnoichthyology and Ethnotaxonomy of the Kichwa Indigenous People of Arawanu (Arajuno), in the Ecuadorian Amazon		
15:30	Marcin Kotowski: Ethnobotany of Tajikistan – preliminary studies, possible potential & future prospects	Michael McLaughlin: Breadfruit Yield Study in Jamaica: Implications for the Development of a Sustainable Value-chain		
15:45	Closing Keynote Speaker: Roland Watson-Grant			
16:00	Location LT3 (15:45 - 16:30)			
16:15				
16:30	Coffee Break (16:30 - 16:45)			
16:45				
17:00	Business Meetings SEB (Location LT3) and ISE (Location LT2)			
17:15	(16:45 - 17:45)			
17:30				
17:45				
18:00				
18:15				
18:30	BREAK - time to visit accomodation and return to campus			
18:45	(17:45 - 19:45)			
19:00				
19:15				
19:30				
19:45				
20:00	GALA AND AWARDS DINNER			
20:15	Location: Courtyard in front of FMS building			
20:30	(19:45 - 22:30)			
20:45				
21:00				
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21:30				
21:45				
22:00				
22:15				
22:30				

ABSTRACTS

All abstracts are organized alphabetically by surname (family name) of the person listed as presenter.

Each abstract has the following format:

Presenter Surname, Presenter Given Name (Presenter Email), Institution, Country
Co-author(s) (if any)

Abstract Title

Abstract

I. Presentations by Keynote Speakers and the Distinguished Economic Botanist



Delgoda, Rupika (thejani.delgoda@uwimona.edu.jm), The University of The West Indies, Mona Campus, Jamaica

Probing Jamaica's medicine chest

In a nation where a majority of citizens turn to nature for solutions to chronic and infectious health issues, it was imperative to gain deeper understandings of such reliance, as a bedrock for launching intricate bioactivity probing into commonly used medicinal plants. A team of scientists in my group have, time and again, sought guidance from varying communities (urban, rural, pharmacy and clinic based), revealing relationships of patients with their communities, with their traditional healers, and with their Western trained physicians, as well as associations with levels of education, economic status among others. A recent survey among cancer patients, revealed that eighty percent relied on

tradition-based practices for their treatment and preventive options. *Annona muricata* L. (Soursop), *Petiveria alliacea* L. (Guinea henweed) topped the charts, with some found to turn to *Artocarpus heterophyllus* Lam. (Jackfruit). Traditional preparations as well as exhaustive chemical extractions, yielded promising activity against prostate, breast and colon cancer respectively, using a combination of cell, enzyme, gene, animal, in vitro, in vivo and in-silico models. Selective impact on cancer cells, enhancement of effectivity of co-medicated chemotherapeutic drugs, positive indicators for chemoprevention, all validated ethnomedical usage. On-going probing continues to convince us that the Caribbean biodiversity rich hotspot that we live in, relied upon by its nature-oriented people, deserves extensive scrutiny to uncover its full promise and for return of value to the communities who use them.



Emanuel, Machel (machel.emmanuel02@uwimona.edu.jm),
The University of the West Indies, Mona Campus, Jamaica
From traditional to commercial production of *Cannabis sativa* L. in Jamaica

Cannabis sativa or ganja was made popular in Jamaica by the fusion of Asian indentured laborers and African peasants working on British owned plantations. This amalgamation of cultures gave birth to a movement known as Rastafari who has openly patronized the consumption of ganja. In the 1940s Jamaica was home to Pinnacle Estate, where ganja was cultivated as a cash crop. Ganja was used as a pretext for raiding, harassing and displacing Rastafari settlements throughout the island as it was seen as an indigenous movement that rejected colonial ideologies. The penalties for cannabis related infractions were sharpened progressively from the 1920s, where mandatory sentences were established for cultivation and trafficking. Post-independence Jamaican Governments were constantly pressured by the US administrations into using paramilitary measures against ganja farmers and traders. These targeted sustained eradication efforts contributed to the demise of the Jamaican landrace cultivar. In 2015, the Amendment to the Dangerous Drugs Act provided reform for the medical and therapeutic applications of cannabis, depenalization of personal consumption, religious and sacramental use. The Cannabis Licensing Authority was established in 2016 to regulate and provide oversight over commercial operations. To date, the Cannabis Licensing Authority has granted one hundred licenses across the four categories: research and development, cultivator, processing, transport, and retail; with most of these licenses being dominated by foreign investors who possess the resources to startup and operate. However, the social and economic constraints faced by the traditional ganja farmers have been a challenge for their inclusivity into the regulated Cannabis industry.



Mathez-Stiefel, Sarah-Lan, (sarah-lan.mathez@unibe.ch),
University of Bern, Switzerland

The future is now: How can ethnobiology contribute to sustainability transformations?

Fifty years after the Stockholm Conference on the Human Environment, the world is facing an unprecedented crisis of climate change, growing inequalities, and biodiversity loss. Incremental change will not suffice to achieve the Sustainable Development Goals; instead, this requires a comprehensive intentional transformation of social-ecological and economic systems. Now more than ever, ethnobiology has a unique role to play: By harnessing multiple voices and knowledge systems for the design of new ways of relating to nature, it can contribute fundamentally to sustainability transformations. However, this requires that ethnobiologists address all of the three

forms of knowledge highlighted by sustainability sciences, namely systems, target, and transformation knowledge. Doing so implies understanding the use and management of plants and animals as part of broader systems interactions and dynamics, engaging with multiple stakeholders and their normative views on sustainable development, and venturing into transformative actions and pathways. I will illustrate my point with examples from recent work involving agroforestry, agrobiodiversity, and non-timber forest products in the Peruvian Andes and Amazon. To conclude, I will call for a stronger positioning of the science and practice of ethnobiology in the global sustainability debate.



Otuokon, Susan (susanutuokon@gmail.com), Jamaica Conservation and Development Trust, Jamaica

Jamaica, Biodiversity Conservation & Community Benefits – Heads or Tails? - How does the Blue and John Crow Mountains National Park and World Heritage Site do both?

The Blue and John Crow Mountains have the distinction of UNESCO World Heritage Site designation for both natural and cultural heritage. It is the core Preservation Zone (26,000 ha) of the 41,000 ha National Park. This protected area is managed by a civil society organisation, the Jamaica Conservation and Development Trust. Conservation of the biological diversity of the site is important for ecosystem services including climate change resilience, provision of recreational opportunities and the water supply for Kingston and eastern Jamaica. This paper explores the approach to management of this protected area, which aims to involve and benefit local communities living around the National Park. The Natural Heritage Conservation programme has a focus on forest restoration using mainly native, non-lumber species with research initiated to propagate threatened, endemic trees from seed. Trees are planted and maintained by community contractors under the supervision of National Park Rangers. The Public Education and Community Outreach Programme aims to facilitate sustainable livelihoods in local communities. The main economic activity in the communities is farming so efforts to improve environmental sustainability have focused on training inclusive agro-forestry and fire management, distribution of tree seedlings and introduction of an alternative in sustainable tourism. A research project will start shortly to better understand the factors mitigating against implementation of environmentally sound farming practices and to develop improved approaches to education for sustainable development. Simultaneously, another project focuses on building capacity for sustainable tourism in 8 Maroon communities and establishing a business network to support the venture.



2022 Distinguished Economic Botanist

Ragone, Diane (diane.ragone@gmail.com), National Tropical Botanical Garden, USA

A Breadfruit Journey: Conserving and Studying a Storied Pacific Crop with Global Significance

Breadfruit has been on many journeys, real and imagined, during its millennial-long history. Islanders nurtured and transported it throughout the vast Pacific as they settled new homelands. Colonial empires schemed to transport it from Polynesia to the Caribbean as part of the network of plantation agriculture and trade economies based on the enslavement of millions of Africans and other people. How and why has breadfruit captured the imagination of so many people? How do we move beyond its dark colonial legacy to recognize and celebrate its cultural importance, value, and potential? My breadfruit journey began 40 years ago and has taken me to dozens of Pacific Islands on a quest to better understand this crop and its diversity; to help conserve varieties and associated knowledge; and to promote its conservation, study, and use for food and reforestation. Countless individuals and organizations, including members of this society, have been collaborators. Their contributions will be highlighted. An overview of breadfruit as a crop and its importance and use in the Pacific Islands; programs to preserve its diversity; and scientific studies on 150 varieties conserved at the National Tropical Botanical Garden in Hawaii will be discussed. Since 2007, nearly 200,000 breadfruit plants have been distributed globally for food security, reforestation, and economic development. New value-added products are generating excitement and economic empowerment for smallholder farmers and local entrepreneurs. This talk will be framed around several of the conference themes: 2) Economic botany/equitable commercialization; 3) Ethnocuisines; 4) Agrobiodiversity/food security; and 6) Botanical gardens.

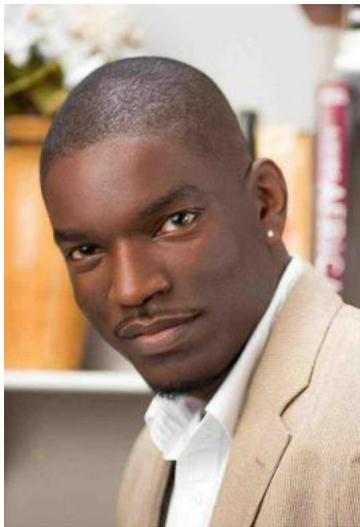


van Andel, Tinde (tinde.vanandel@naturalis.nl), Naturalis Biodiversity Center, The Netherlands

300 years of colonial history in a rice field

Maroons, descendants of enslaved Africans who ran away from the sugar plantations in the 17th and 18th century, live in tribal communities in the remote rainforests of Suriname and French Guiana. Maroon women grow more than 200 rice varieties that are hardly known to science, but differ substantially from modern cultivars. Through ethnobotanical surveys, archival research and advanced genomic analysis of these Maroon rice varieties, we try to analyze their geographical origins and migration history. Fieldwork in Maroon villages yielded in a huge diversity of rice varieties, several distinct agricultural practices and personal motivations to maintain this unique diversity. We compare Maroon traditional knowledge on the history of their rice with archival documents and

show that rice, smuggled along during their flight to freedom, enabled them to successfully establish themselves in the country's interior. Future whole-genome sequencing of Maroon rice samples and comparison to rice varieties worldwide (including wild and weedy types) will shed light on the origin of their rice. Two different myths on the origin of Maroon rice exist: one about female ancestors who hid grains in their hair, both in Africa and Suriname, and one about wild rice collected from an open swamp owned by a dangerous forest spirit. We therefore hypothesize that Maroon rice fields reflect 370 years of migration history: a mix of ancient African varieties, historic US cultivars, rice exchanged with Asian contract laborers after the abolishment of slavery and self-developed varieties by means of crossing with wild rice species, growing in natural savannas.



Watson-Grant, Roland, Jamaica

"I can't find my keys." Rediscovering Crucial Pieces of Who We Are.

How does it feel to lose your keys? Frustrated. Lost. Helpless. You can't remember where you put them, you're stuck at your office, unable to drive until you find them, or stuck at your door unable to get inside your house, all because a small, but important tool is not in your possession. It's times like that, that make you wish you had a key finder.

It's a similar thing to with losing key pieces of our heritage, be it material culture, cultural practices or biodiversity. And so perhaps in the same way the key finder is one of the greatest inventions for lowering blood pressure, the work of ethnobotanists and anthropologists like yourselves is helping us rediscover crucial pieces of our identity lost under time, conquest, oppression, lack of knowledge or lack of practice or is in danger of being destroyed by development. Perhaps key finders like yourselves help a people, become unstuck, open doors and move forward.

In some cases, a cultural practice is stuck in time not because of lack of knowledge, but because of legislation. Laws that have long outlived those who created them based on bias. The ancestral practice of Obeah is one such key, outlawed by colonial powers, and still seeking salvation. My father was not an anthropologist, but Obeah was a piece of our heritage I would discover through him. This is that story.

II. Abstracts of Oral Presentations (Symposia)

Alcantara Rodriguez, Mireia (m.alcantara.rodriguez@gmail.com), Leiden University, The Netherlands

Ethnobotany & Art: What can botanical illustrations reveal about colonial science in seventeenth century Brazil?

Botanical illustrations are more than beautiful works of art, or scientific entities. When looking at them through the ethnobotanical lens, they can reveal multiple stories. We study the botanical illustrations within the Brazilian collection of the Libri Picturati (kept in Krakow, Poland), and the book *Historia Naturalis Brasiliae* (Marcgrave & Piso, 1648). In both visual and textual sources, indigenous (botanical) expertise was appropriated and merged into European epistemologies. We identified over 500 images that aimed to depict the flora in and around the colony of Dutch Brazil in the mid-seventeenth century. By knowing the plant species behind these images, we reveal their origins and whether they are still present, or they became threatened due to Western methods of land exploitation. We encountered first records of several exotic species in Brazil; we found out whether these plants grew wild or were cultivated; how they were gathered and represented; and how they were used- and named- by Indigenous, African and European peoples. Our outcomes reveal new insights on plant dispersion and trade by multiple ethnic groups, their methods of plant collection, and the retention of plant use in Brazil – when compared to contemporary Brazilian ethnobotanical studies. By making these biocultural collections more accessible, we can study them from different perspectives (e.g., ethnobotany, art history, ecology, linguistics) and hence, unravel several (plant) stories. This way, we can encourage conversations between a more diverse audience across disciplines. But, considering their colonial context, what else could we do to manage these botanical collections?

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Local perceptions of environmental-biological changes driven by climate change

High mountains and the local communities living there are of particular importance in terms of biodiversity and cultural diversity. Climate change affects these socio-ecological systems more substantially than the global average and has a significant impact on ecosystems and local communities. A thorough understanding of these changes requires exploring the perceptions and observations of local communities. The study focussed on a mountainous region in the Eastern Carpathians, Romania, Central Europe. Climate change-related local indicators and perceived trends were studied through participant observation, semi-structured interviews, and focus group discussions. Based on the local perceptions and observations of the farmers, the most important weather trends were the increase in average winter and summer temperatures, temporal changes in the distribution of precipitation, and changing seasonality. Climate change-related trends seriously affected the local ecosystems and land-use practices. The vegetation growth of the meadows has accelerated, the flowering and fruiting time of culturally salient, wild edible, and medicinal plants and crops advanced. The appearance of new pests and the proliferation of previously present pests affect crop yields. As a consequence, local farmers' farming activities had to adapt to phenological and agro-phenological trends: mowing of mountain hay

meadows, sowing, and harvesting of crops advanced in the last decade significantly. Local farmers monitored changing weather patterns and ecological-biological changes through several indicators. Perceived trends had a significant impact not only on wildlife but on agricultural activity as well. These challenges put the adaptability of local socio-ecological systems to the proof.

Baker, Janelle Marie (janelleb@athabascau.ca), Athabasca University, Canada

Boreal Food Sovereignty across Borders: The Creation of a Subarctic Centred Website

This paper describes a collaboration between anthropologists from University of Aberdeen in Scotland and Athabasca University in Canada to develop a method for documenting food sovereignty and related biodiversity of Boreal and Subarctic Peoples. The research is grounded in partnerships with Bigstone Cree Nation and Smiths Landing First Nation in Canada, as well as local communities in Scotland (Ft William, Grantown on Spay, and Wick) to create an interactive website on Boreal foods to open a global discussion on the distinct nature of northern food systems. The website demonstrates through video, photos, and content that subarctic communities supplement their diets with wild foods (hunted animals, berries, plants, seaweed). The procurement of wild foods has its own barriers in colonial regulatory frameworks, disruptions from resource mining, and more recently environmental pollution. We document the common challenges of supporting access to wild foods by examining the impacts of state regulation, industrial resource extraction, and food safety. The project is designed to address several of the Sustainable Development Goals. In particular, we focus on the implications of climate change, ethno-aquatic resources, biodiversity conservation, and social justice and ethnobotany. We provide evidence of how rural and Indigenous communities creatively use local plant and animal resources, often harvested at the edges of plantations or oil extraction facilities, to understand how local food systems build resilience and promote equal opportunities. Our focus on identifying barriers and enablers of local food procurement shows how local planning and harvesting can be encouraged and promoted.

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What's in a name? Ruminations on Cannabis classification and nomenclature

Cannabis (Cannabaceae), is one of the world's earliest domesticated and most useful plants, widespread, and diverse in form and chemistry. The genus has a complicated history of classification and nomenclature. Besides its long-debated division into sativa/indica/ruderalis, it has layers of alternative naming schemes based on morphology, physiology and chemistry. Named selections often have colorful monikers; some are known only as clones, others as seeds, or both. Are these strains, cuts, cultivars, chemovars, races, or lines? Modern breeding techniques and legal concerns add another layer of complexity. This paper will review formal and informal approaches to Cannabis naming and provide examples with elements of lore, legend, fact and fiction.

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Transformation of indigenous agrobiodiversity in southwestern North America during the 19th century

Even though conventional perspectives of North American agriculture focus on Mesoamerican maize, beans and squashes, agrobiodiversity of southwestern North America (USA and Mexico) was based upon species uniquely adapted to extreme and diverse habitats. The management and employment of these distinctive floristic resources by Native Americans and *Pueblos Originarios* were dismembered by governmental dislocation programs in the 19th century. Indigenous practices of domestication, husbandry, and nutrition involving edible plants in ancestral foodways during this period are poorly documented. A diachronic analysis of the botanical specimens, field notes and publications generated by Dr. Edward Palmer from his field work in southwestern USA and northern Mexico (between 1860 and 1910) indicates that during the 20th century about half of the plants retained their nutritional importance while 13% of the edible plants were abandoned. Prejudicial attitudes toward nutritional and sensorial attributes of indigenous foods, exclusion of access to ancestral resource sites, and failure of institutional agriculture to recognize indigenous agrohabitats and incipient domestication are among the causes suggested from Palmer's observations.

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Exploring the Archaeological Biographies and Plant Food Diversity of Western North American Food Preparation Features

Earth ovens, hearths, and middens are common archaeological features in western North America that contain the residues of everyday activities. Ethnographic and archaeological research indicates these in-ground food preparation features were frequently reused over many months and years. These quotidian features therefore can be productively thought of as having use-lives or biographies. Here we present a framework for interpreting the biographies of western North American archaeological food preparation features. We illustrate the value of this framework through a multiproxy analysis of archived soil samples from two food processing sites on the Columbia-Fraser Plateau in northeastern Washington State, USA. We draw on paleoethnobotanical, geoarchaeological, and fire-modified rock analyses to demonstrate that a wide range of economic plants were processed at this location, indicative of a dynamic and flexible subsistence system. We further suggest that residents and visitors to these sites from ca. 2700-200 cal BP frequently returned to and reused earth oven features as they processed multiple plant food taxa. Our case study illustrates the potential of biographical approaches as a methodological and theoretical approach to teasing apart multiple food preparation recipes, methods, and events, as well as adding paleoenvironmental datasets to contemporary tribal food security projects.

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Co-authors: Ibarra, José Tomás; Calvet Mir, Laura; Braga Junqueira, André
Observations, drivers and adaptations to social-environmental changes in Important Agricultural Heritage Sites of southern South America

Current social-environmental changes such as climate change and biodiversity loss are interconnected and affecting people's livelihoods worldwide. Peasants are some of the most vulnerable to the impacts of these changes, but their knowledge and needs are rarely considered in public policy. The aim of this study was to document the (i) observed social-environmental changes occurring in their environments, (ii) perceived drivers of those changes and (iii) adaptation strategies to deal with those changes by peasants. During 2021 and 2022, we conducted 30 semi-structured interviews in the Andes mountains of La Araucana and in the Chiloe archipelago (Chile), both considered as Important Agricultural Heritage Sites by FAO. The participants reported 66 and 52 different observations of social-environmental changes occurring in La Araucana and Chiloe; respectively. In both sites, changes related with droughts and water availability were particularly salient. Concerning water availability, in Pucon participants tended to relate these changes to the drying up of rivers, while in Chiloe people most often mentioned changes in rainfall. This is especially important considering that peasant livelihoods depend, in large part, on the availability of water for agriculture. Similarly, strategies to adapt to drought were the most mentioned in both sites. These results suggest that, even when social-environmental changes could be understood similarly in different locations, both drivers and adaptation measures may be context dependent. Our results highlight the potential of local knowledge to understand social-environmental change and to provide support for the development of public policies that are well suited to local contexts.

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The Black Plant Use Study: A Womanist Ethnobotanical Survey on Plant Cultivation, Care, and Well-Being

The purpose of this study is to explore the concept of care and well-being among Black persons involved in agricultural (ecological) based work, specifically around engagement with specific plants used for the purpose of mental and physical health as well as spiritual uses of plants. This study also seeks to explore participant's beliefs, experiences, and practices involving plants in everyday life as a part of their wellness practices or ceremonially. The question this study seeks to answer is, what plants are useful for Black Growers living in the southern regions of the United States and the Caribbean islands. This study explores plant usage mental, physical, and spiritual health and wellbeing, more specifically the use of plants for relaxation, reproductive and respiratory wellness, cleansing rituals, and during ceremonies / celebrations. It is possible that there could be a shared knowledge of plants as well as shared experiences around the therapeutic benefits of gardening and the use of certain plant material for dietary, medicinal pharmacopeia, and magical-medicinal purposes. This research explores the historical and contemporary experiences of Black life and the use of plants in a way of ethnobotanical agency, contingency, continuity, and innovation. This research answers that call, particularly with those concerned with the notion of ethnobotanical agency in the areas of spiritual experiences, care (care of self; care for community; and care of the environment), as well as mental and physical well-being.

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Stirring the Pot: Feeding Alaskan Sled Dogs

Sled dogs have long been essential in Circumpolar north communities as transportation and companions. This paper focuses on the “fuel” needed to run these fur-encapsulated engines. As the most common means of feeding the work animals, mushers prepare a specially constructed soup containing game meats they have harvested or received from other hunters. Creating the dogs’ soup is simple in terms of recipe and production, but complex in availability or necessity. Hunting bear, moose, and at times caribou are a means of protein available in most communities. However, salmon—specifically dogfish or chum salmon—has historically been the provider of sustenance for sled dogs. Fish racks are a common feature in any kennel to store and dry the thousands of fish needed to feed sled dogs through a long winter season. This practice is used especially so that both human and animal components of a sled team can easily compete for food sources during tough times.

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The Periodic Table of Food Initiative

Food is at the center of the world's most urgent challenges and largest opportunities. According to the World Health Organization, malnutrition is the leading cause of death and disease globally. Yet, our scientific understanding of the foods that nourish us is still quite rudimentary. At most, 150 of our food's biochemical components are measured and tracked in conventional databases, which only represents a tiny fraction of the tens of thousands of biochemicals in food. Beyond health, we also know today's food production negatively impacts the quality of our water, soil, and air, and contributes to climate change. A food system that supports human and planetary health requires a better understanding of the interactions between food, health, nutrition, and environment. The Periodic Table of Food Initiative will vastly expand our understanding of the biochemistry of our food and develop impactful demonstration projects that exhibit the power of this new understanding. Building on recent advances in data science and analytical chemistry, the initiative will develop low-cost mass spectrometry kits, standards, methods, cloud-based analytical tools, and a public database that will include a quantitative and qualitative analysis of a large variety of foods representative of geographic and cultural diversity worldwide. Once the database is in place, the scientific community and private sector will be incentivized to build on this public resource by adding analyses of additional foods, varieties, and preparation methods. The PTFI technical platform will enable conditions for a rapid acceleration in research and innovation in both the public and private sectors.

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Domestic pigs living in forests and marshes: traditional knowledge of pig keepers and impacts of pigs on vegetation in Southeast Europe

Extensive pig keeping has been one of the main forms of temperate forest use throughout Europe for millennia. Now this traditional system has almost completely disappeared. We conducted indoor and outdoor interviews on domestic pig grazing in forests and marshes with traditional pig keepers (svinjars) along the Sava river in Serbia, Southeast Europe. We used participatory fieldwork, personal visual observation of pigs' foraging behaviour, and vegetation surveys to document the knowledge of svinjars on pig–plant relationships and the impact of pig activity on the vegetation. Svinjars distinguished at least 181 wild plant taxa and had knowledge of 154 species foraged by pigs. Svinjars knew the species “from the mouths” of their pigs, including seasonality of consumption, and how different taxa were foraged. Pigs mainly impacted the forest and marsh vegetation by trampling and rooting, not by grazing. Disturbances by pigs prevented competitive marsh species from spreading and maintained microhabitats for plant species red listed in the region and in Europe. Only high intensity disturbance changed markedly the species composition of the herb layer, and parallel it slightly decreased the abundance of mesic forest specialist plant species and the cover of the shrub layer. Traditional pig keeping thus contributes to the nature conservation value of the floodplain habitats. We consider that the practice and knowledge of the Serbian svinjars is one of the last examples of traditional multifunctional land use, and it is a valuable and highly vulnerable part of the intangible cultural heritage of Europe.

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Sustenance and sustainability: a review of the edible orchid trade

There are at least 30,000 species of orchids and their uses include food, medicine, ornamental and cosmetic use in addition to their many ecological functions. This in-depth review focuses on the international trade and conservation impacts of food products that contain orchid specimens with a focus on chikanda use in Africa and salep use in Central Asia and Europe. The family Orchidaceae is regulated by the Convention on International Trade of Endangered Species (CITES) which ensures international trade is not detrimental to wild populations. To-date case studies of orchid use have been presented to CITES signatories, but a comprehensive review has been lacking. This desk-based study undertakes a global scoping review of the principal food products in international trade that contain orchid specimens using online data collection, literature analysis and key informant interviews. This study finds there are over 200 documented edible orchids. It analyses geographic patterns and temporal dynamics of the availability, trade routes and pricing of Salep and Chikanda products, using the CITES Trade database, supplemented by a systematic manual and automated online search for products in trade. The conservation impact of trade in Salep and Chikanda products is assessed through biological data, conservation status, sources of harvest and estimated harvest volumes. This deeper understanding of orchid use regionally as well as globally will provide a starting point to facilitate CITES trade.

Diaz, Rosalina (msrdiaz62@gmail.com), Medgar Evers College, CUNY, United States
Decolonizing Paradise: A Radical Ethnography of Environmental Stewardship in the Caribbean

In this presentation, which introduces *Decolonizing Paradise: A Radical Ethnography of Environmental Stewardship in the Caribbean* to be published in 2022 by Peter Lang Publishers, Dr. Diaz discusses her radical ethnographic research in post-hurricane Puerto Rico, and shares her conversations with local scholars, grassroots activists, native healers and community agriculturalists/farmers and brujas, regarding issues of cultural & indigenous identity, “home-grown” sustainability initiatives, decolonization and self-determination in the Greater Antillean region of the Caribbean, in the shadow of ongoing climate change threats. Contrary to popular belief, the ancestors of modern-day Caribbean people weren’t Taino, Carib or Arawak (these were European designations). They were one people who traded goods, shared resources, knowledge and cultural traditions. As a result of European colonialism, the cultural development of the indigenous population in the Caribbean was radically disrupted and valuable networks were dismantled. Much cultural knowledge, including plant wisdom, went underground. Herbal healers, shamed and ridiculed as “brujas” and “santeras” continued to practice in obscurity. This presentation, and the greater project it represents, is an invitation for respectful and equitable knowledge sharing and coalition building that transcends borders, politics or ideologies – a call for a return to the collective and sustainable values of our indigenous ancestors, in a world that has grown increasingly individualistic and uncaring.

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Socio-environmental risks of potential lithium mine in Jadar, Serbia

As the demand for lithium battery-powered technology surges amid “green revolution” mining becomes the next environmental and human rights issue at hand. Potential exploitation of jadarit, a lithium deposit in Jadar Valley in western Serbia, by the “Rio Tinto” corporation, poses a risk for irreversible water, soil and air pollution, biodiversity loss, and population displacement. The exploitation will require the use of ~1000 t/day concentrated H_2SO_4 followed by other chemicals. The final products would yield H_3BO_3 , Li_2CO_3 and Na_2SO_4 . Dried, toxic tailings would be disposed of in the impoundments located on the now fertile, agricultural land between two torrent rivers (a historically flood-prone valley). Deep groundwater around the ore rock contains extremely high concentrations of boron, and also lithium, iron, arsenic, methane and hydrogen sulfide. The current research examined surface soils around the pre-exploitation testing drill holes, and water from Jadar River. The boron concentration in surface soils is the highest in migratory fraction (96%). Concentrations of arsenic, boron and lithium in Jadar rivers water are 9, 17 and 3 times higher respectively 25 km downstream of the mine zone compared to 2 km upstream. Thus, the detrimental impact of the company’s potential Jadar mine in the research phase significantly exceeds the projected impact zone. The analysis of the qualitative data collected from the local population indicates the presence of damages to homesteads due to the perpetual leaching of toxic underground water around testing drill sites, water insecurity, and extreme distress from potentially being forced off their ancestral lands.

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The biocultural conservation of epiphytic orchids in Oaxaca, Mexico: experimental reintroduction of monjitas (*Prosthechea karwinskii*) after ceremonial utilization

The harvest of forest resources by rural communities puts pressure on the preservation of plant diversity, yet traditional land-use practices also generate cultural incentives for sustainable management. An example of social-ecological impetus for conservation is in Mexico, where 30% of the country's 1,300 native orchid species are wild-harvested for ornamental use in religious celebrations. In Oaxaca, the community of Zaachila harvests ~5000 *Prosthechea karwinskii* (Orchidaceae) to adorn local chapels during Semana Santa. The practice is a component of Oaxaca's biocultural heritage, but due to harvest pressure, climate change, and deforestation, *P. karwinskii* populations are in decline. We initiated a biocultural approach to test the feasibility of reintroduction as a conservation measure, identify the microhabitat preferences of *P. karwinskii*, and understand the cultural contexts of orchid harvest. Growth of *P.*

karwinskii pseudobulbs after utilization was measured in a nursery experiment; 46% of harvested pseudobulbs displayed growth after three months, suggesting potential reintroduction success. Interviews with 15 orchid-harvesters were conducted, transcribed, and coded; the distance traveled by harvesters has increased as orchid populations decline, and harvesters support conservation methods that do not discourage traditional practices. In collaboration with the Zaachila government and orchid-harvesters, we established an experimental reintroduction site to an effort to restore epiphyte-degraded forests, continue harvesting traditions, and prevent *P. karwinskii*. After harvest and use in Semana Santa 2022, ~3000 *P.*

karwinskii pseudobulbs will be reintroduced to the canopy of a forested site where *P. karwinskii* populations have been extirpated due to excessive extraction. Monitoring will occur to answer the questions: 1) How do survival, growth, and reproduction rates of reintroduced *P. karwinskii* vary as a function of phorophyte species, elevation, and canopy microsite? 2) What is the feasibility of orchid reintroduction as a community-managed conservation plan? Results will be used to identify sustainable harvest limits and inform reintroduction protocols for orchids harvested by communities across Mexico.

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A video article: Transferring ethnopharmacological results back to traditional healers in rural indigenous communities in Uganda

In the field of ethnopharmacology, scientists often conduct field studies, surveying indigenous communities to identify and collect understudied natural remedies such as medicinal plants that are yet to be investigated pharmacologically in a laboratory setting. The Nagoya Protocol and the Convention on Biological Diversity provided international agreements on financial benefit sharing and recognized each nation's sovereignty over the biodiversity resources within its borders. However, what has yet only been poorly defined in these agreements are the non-financial benefits for local intellectual property right owners and the bidirectional transfer of knowledge back to the traditional healers who originally provided the respective ethnomedicinal information. Unfortunately,

ethnopharmacologists still rarely return to the local communities after the sample collection, laboratory analysis, and publication of results in scientific journals. In this 26min video article, we present a method for transferring results back to traditional healers in rural indigenous communities, taking our previous studies among 39 traditional healers in the Greater Mpigi region in Uganda as an example. Our approach is based on a two-day workshop, and the results are presented as original footage in the video article. Our work demonstrated a successful method for ensuring bidirectional benefit and communication while fostering future scientific and community-work collaborations. We believe it is the responsibility and moral duty of ethnopharmacologists to contribute to knowledge transfer and feedback once a study is completed. Furthermore, the workshop method, as an example for science outreach, might also be regarded as a valuable contribution to research on education theory and science communication.

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Beauty with a Purpose: The history and global significance of Cinchona Botanical Gardens, Jamaica

In the 1860s, the colonial rulers of Jamaica embarked on experimental cultivation of Cinchona in the Blue Mountains with a view to setting up a profitable industry. The bark of selected species had proven efficacious in treating malaria, the leading cause of death in the tropics at that time. The prevalence of malaria in the Caribbean and elsewhere had thwarted Imperial ambitions for conquest due to high mortality rates amongst troops and settlers alike. The quinine containing bark was gaining prominence internationally as a highly valuable economic commodity and the Government and Assembly of Jamaica wished to gain a share in this emerging market. Cinchona Gardens thus became an important experimental and supply hub in the global Colonial Botanical Network. For many political and economic reasons the Garden's importance has ebbed and flowed dramatically throughout its 160-year history. The Garden has supported the diverse research agendas of important botanical research centres including the Royal Botanic Gardens, Kew, The New York Botanical Garden, Cambridge University and The University of West Indies. This paper traces and illuminates the fate of this once extensive 600-acre Government Plantation and its reduction to a small 10-acre remnant of its former glory and importance. There have been diverse initiatives to revive the gardens over the past 50-60 years. The EKC Legacy Group, a network of scientists from the UK and the Caribbean, who have committed to reviving the Cinchona Gardens, leads the current initiative.

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Indigenous Food Systems Beyond Borders: Honoring Ancestors and Food Through Collaborative Community Projects

Christina Edwin (Dena and Chicana) and Itzel Zagal (Mexica, Xochimilca and Chichimeca) work together to change the narrative of Indigenous and Latino peoples in Alaska. We reassert our Indigeneity through community projects that honor our

Ancestors and food. For Alaskan Natives tribes and Indigenous people from Mexico, the relationship with the Ancestors is fundamental to our worldview. Honoring our deceased family, friends, and leaders with ceremony, prayers, songs, or offerings may look very different among our communities, but the essence is similar: the continuous nourishment of the relationship with our ancestors. This presentation highlights two projects: a recently completed documentary called *Sabor Artico - Latinos en Alaska*, which takes up food as a lens to understand the Latino experience in the Circumpolar North; and a community celebration of Día de Muertos hosted in Anchorage, Alaska. For the latter, we constructed an altar dedicated to Olga Ezi (Ahtna Dene, a matriarch in the South Central Dena'ina communities of Alaska), which allowed us to honor and dignify the memory of a local Indigenous Matriarch among Latino Americans and Alaskan Natives together. This was the first Día de Muertos dedicated to an Alaskan Native woman, and the first time that many participants had the opportunity to see this kind of an alliance in our communities.

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Conscience and Sustainable Cultivation of Cannabis

Controlling the levels of THC, CBD, and terpenes through minimal organic inputs, breeding, and sunlight alchemy. We are able to apply a system that over time will enhance and build the native soils for long term sustainability. BioBizz Pre-Mix, a dry fertilizer, cover crops "green manure", and microbes are applied to the native soil combined with non-GMO breeding for traits and historical significance. The deprivation or addition of light, depending on the time of year causes the amount and quality of the flowers to be increased by shortening the flowering cycles. This also creates greater pest and pathogen resistance. Lastly, by controlling the frequency and duration of water and materials we are able to stimulate growth and flowering. Through these minimal abstractions to the natural life cycle we are able to achieve consistent quality harvests through soil enhancements, and conversion.

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“Grandma, Grandpa, Auntie, how do I use this?”: Keeping ethnobotanical intergenerational knowledge alive

Tanzania, People use plants throughout the world, and in every corner of the globe when elders pass away, their knowledge dies with them. This phenomenon is especially important in regions where natural areas are threatened. In Tanzania, next to Gombe, the park in which Jane Goodall and her organization research chimpanzees is the village of Mwamgongo. Previously, in an effort to promote conservation of the miombo woodland and to protect cultural knowledge, we made an ethnobotanical booklet. For this current project, we returned to the area focusing not just on creating a tri-lingual record of plant use and cultural importance for the community, we also focused on empowering the village youth to be the caretakers and promoters of their own cultural heritage and ecosystem protection. We conducted informal and semi-structured interviews with ethnobotanical experts from the older generations. We also held afterschool workshops with village children, where we taught them how to interview their

own elders, collect botanical specimens, and to make their own mini-herbaria. Through working with multiple generations, the information stays alive and the connection to the environment has a better chance of remaining important. We made the collaborative book with the community, the children learned skills to keep their own information alive and other classes asked to do similar projects. Incentivizing people to protect their own environment can be more effective than outsiders trying to do it for them.

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Tradition in flux: Changing ethnobotanical landscapes of anticholinergic Solanaceae plants in Europe

Throughout recorded history, anticholinergic members of the Solanaceae have played important roles in the ethnobotany of the European continent. Represented primarily by the genera *Atropa*, *Datura*, *Hyoscyamus*, *Mandragora*, and *Scopolia*, these plants have been extensively used as medicines, poisons, recreational substances, and for ritual purposes. Though once crucial, their roles have changed over the years. Indeed, multiple historical events can be attributed with their progressive loss in popularity and change in use. Ultimately, the historical landscape for these plants is one of change, and often also of speculation. Although today some traditional knowledge and use lives on, these plants have largely been discarded, often being perceived solely as poisonous. As such, their use has likewise shifted, which has been directly linked with both cultural knowledge and societal views of these genera. There is, however, a rising trend toward reclamation of past knowledge in Europe. In relation to these anticholinergic plants, this appears to be catalysed by access to information through widely available media rather than through traditional transmission networks within communities and families. This represents an attempted connection with a mythical past cultural state, with these plants often serving an important symbolic role in the constructed new reality. Rather than existing apart from more widespread modern uses, the two manners of use seem to mutually support each other. Not only does this raise questions as to notions of the "traditional," but also of how knowledge and cultural meaning are made and shared in the current global information age.

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Tracing migrant Maroon ethnobotany from farm to shop: a case study of revitalised knowledge transmission

The aim of this research is to better understand how Maroon ethnobotanical knowledge and practices are shaped by the migratory process from Jamaica to the UK. Maroon communities, in recognising their ancestral West African and indigenous geneses, place great value on preserving Akan traditions. This is notable through their material culture and critically through their ethnomedicinal practices. These practices via a process of continual adaptation and innovation have come to form a unique botanical pharmacopeia. A popular Maroon herbal shop in Southeast London and its affiliated farm in Moore Town, Jamaica will form the boundaries of this case study to evidence the adaptive and evolving nature of knowledge as it travels between spaces. This research is theoretically situated within the field of migrant and urban ethnobotany; thus, it seeks to unearth wider implications of the herbal shop and its interconnected farm for the diaspora, maroon and migrant community and make novel contributions to the field.

A biocultural approach will be adopted when carrying out research to elucidate the value and dispersal of how knowledge is influenced by the broader political and spiritual epistemologies of the Maroon community. Evidence suggests that Maroon medicinal plant knowledge and practices are being lost due to societal change and pressure, especially among the youth. Subsequently a critical indigenous pedagogy will be sought to anchor the methodologies of this project around ethics and social justice which empower self-determination in the Maroon community whilst making a valuable contribution to safeguarding Caribbean cultural spaces in Southeast London.

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An integrated understanding of coffee alternate bearing and feedbacks with farmer decision-making across scales

Coffee plants exhibit alternate bearing in which a year of high fruiting is followed by a year of low fruiting. When synchronized, alternate bearing can lead to variable farm income with negative implications for farmer livelihoods. Yet our understanding of coffee alternate bearing and its potential feedback with farmer decision-making is underdeveloped. In collaboration with 30 coffee farmers in Santa Maria de Dota, Costa Rica, we characterized patterns of alternate bearing at both the plant- and farm-scale and explored their relation to farm management practices and elevation. Data consisted of 10 years of farm-level production, 2 years of plant-level reproduction, and farmer interviews. We found that alternate bearing frequently persisted at a farm scale, and plant-level analyses offered support for resource depletion as an underlying mechanism. Farmers possessed detailed knowledge of alternate bearing, including intrinsic and extrinsic drivers operating at different scales. Qualitative interview analysis indicated that alternate bearing played an important role in management decision-making, yet quantitative analyses revealed no significant relationships between indicators of alternate bearing and variability in management practices across the farms. Higher elevation farms, however, tended to have steadier yields. Farmers were more willing to limit household expenses than they were to limit farm management following a low-yielding year, citing fears that doing so would severely impact farm health. The results suggest limited farmer capacity to achieve consistent yields via management; opportunities to support more adaptive responses to low-yielding years include expanding income diversification and securing farm health with less reliance on agrochemical inputs.

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***Musa*, Afro-descendants and Socio-Environmental Transformations: Livelihood Trajectories in Andagoya, Chocó, Colombia**

Andagoya is a rural village located in the Northwest of Colombia. Historically, different actors, interests, and technologies have converged in this territory, causing profound socio-environmental transformations. This study focuses on the intersection between political ecology and biocultural diversity. By using cultural domain analysis and ethnographic interviews, this research aims to explore the impacts of socio-

environmental transformations on the livelihoods of the inhabitants of Andagoya by addressing the patterns on knowledge, consumption, and availability of *Musa* spp. varieties in this village. Despite the current importance of this food staple in the village, there is a loss in the bicultural diversity of *Musa* spp. Furthermore, a shift in the consumption patterns of the villagers portrays both resilience thanks to the agrobiodiversity maintained by past generations and a crisis regarding their food sovereignty. A spatial overlapping of the transactional orders of the dual economy of the afro-descendant agro-miners and the increase in coca production (*Erythroxylum coca* Lam.) proved to be the two main drivers of these transformations. This research seeks to contribute to the theoretical field of anthropology of food, political ecology, and biocultural diversity. Moreover, it strives to better understand the interconnectedness of the global market economy on the livelihoods of rural communities settled in the Pacific region of Colombia.

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Homogenization of public knowledge and uses of plants and fungi in urban environments: A case study survey from Colombia

Biodiversity holds immense opportunities to contribute to sustainable and equitable development, especially in biodiversity-rich, tropical nations. Yet, little is known about how much the general public understands and uses native plants and fungi in these countries. This research aims to bridge this gap by exploring how much the general public knows and uses plants and fungi in the second most biodiverse country in the world. It addresses three specific questions: 1. How much do people know, use and assign importance to plants and fungi? 2. How much does the urban-rural divide impact these responses? 3. To what extent does age shape the level of knowledge and the extent of use among respondents? A mixed-methods approach consisting of an online poll and semi-structured interviews was used to contextualize responses. Our study suggests that people know, use and consider plants more important for their well-being than fungi. Human food appeared as the most important use for both taxonomic groups. Regarding the urban-rural divide, our results also show a heightened perception of the importance of plants and fungi for people's well-being among rural residents, significantly influencing the number of fungi species identified by both groups and the diversity of ways in which they use plants and fungi. Finally, we found that knowledge and importance for well-being varied with age only in the case of plants. This study portrays the importance of plants and fungi for well-being and highlights the potential role Colombia's useful plant and fungal diversity can play in achieving sustainable development.

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“Gather ye fragments that are left that nothing be lost” : Insights for biocultural revitalisation from early-twentieth century Cornwall

The early-twentieth century Cornish Revivalists sought to revive forgotten traditions and instill pride in the cultural identity of Cornwall as part of the broader Celtic Revival movement. Through the federation of societies they formed - with their motto ‘gather ye fragments that are left that nothing be lost’ - they aimed to salvage not only the lost

Cornish language, but “all those ancient things that make the spirit of Cornwall”. One of those things was “pillas” - a naked-grained oat that had once been locally significant, but by the mid-1800s was understood to have gone extinct. Spotting an advert for ‘Avoine nue grosse’ in a Parisian seed catalogue - believing it to be none other than the elusive Cornish grain - one Revivalist set about acquiring and sharing seeds with a view to reviving it. A closer examination of these efforts almost a century later reveals the ever complex and sometimes ambiguous nature of biocultural revitalisation. In a case of mistaken botanical identity, it now seems that these seeds were not actually “pillas”, but nonetheless served as a vehicle for cultural revival and helped keep ethnobotanical knowledge about the lost crop alive. Highlighting identity, authenticity, time, and the complex interplay between the biological and the cultural as factors for consideration, this case offers insights for the conservation of biocultural heritage today. In particular - owing to its survival in ex-situ collections - the chance to apply them to a renewed attempt at reviving pillas, already underway.

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The Bosnian pita in St. Louis, USA: inquiry of a dish as cultural keystone

Cuisine is formed from relationships between ingredients, between people, between a community and its landscape. Certain dishes grow in practice and meaning to become emblematic of a group of people in a place. In diaspora, those dishes are recontextualized and adapted to a new land and new relationships. As part of a larger investigation of Bosnians in St. Louis, Missouri USA, the role of traditional dishes in settlement success and well-being of refugees was obvious and complex. In an attempt to explore and explain this phenomenon and its complexities, the framework of "keystones" was borrowed from ecology (keystone species) and ethnobotany (cultural keystone species). This study proposes a working definition of cultural keystone dish as an extension of these previously established terms, proposes criteria for determining the keystone role of a dish, and tests these criteria against traditional Bosnian dishes. Through participant observation, historical sources, and questionnaires, a few dishes stood out among Bosnian St. Louisans. Pita, the clear leader on surveys, was tested against the criteria, allowing us to explore what aspects of this dish may have led to its importance to our study group, such as the occasions it is made for, its difficulty, adaptability, role in the home country, and the memories evoked by thinking about, making, and eating this dish. Pita does indeed stand up as a cultural keystone dish, offering a possible framework for future research in food studies.

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Open field cultivation of Narrow-leaf drug vs. Broad-leaf drug cultivars of *Cannabis sativa* L. in Jamaica

The cultivation of *Cannabis sativa* subsp. *indica* for the presence of therapeutic substances has been selected by humans for many centuries in varying climatic zones from equatorial to temperate regions. The photo-sensitive nature of cannabis to diurnal and nocturnal fluctuations in different regions has allowed for physiological and morphological adaptations. The objective of the experiment was to determine the

comparative differences in open field cultivation of narrow leaf (NLD) and broad leaf drug (BLD) cultivars in Jamaica. Two cultivars Afghan Kush (BLD) and a Jamaican native (NLD) cultivar was propagated sexually for open field cultivation over three growing cycles. The parameters were assessed upon transplanting of seedlings into the open field to completion of postharvest activities. Maturity was attained after 10 weeks for the NLD when compared to 7 weeks for the BLD cultivar. Upon harvest an average plant height of 58.2 cm and 22.5 cm was achieved respectively for NLD and BLD cultivars. The NLD cultivar had 378 leaves with 14 branches, while the BLD cultivar attained 134 leaves with 2 branches. After drying the NLD cultivar had an average bud weight of 16 g, 17 g trim weight and 9.6 g stem weight, while the BLD cultivar had 5 g, 4.5 g and 1.5 g respectively for bud weight, trim weight and stem weight. The significant ($p \leq 0.05$) differences observed throughout the crop cycle between cultivars, provides evidence that cannabis cultivars with longer flowering times will be more productive for open-field cultivation in Jamaica.

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Social Innovation and entrepreneurship for biocultural conservation in the Amazonian-nut value chain, Brazil

The Amazonian-nut (*Bertholletia excelsa*) has been a major forest product throughout the Amazon, supporting the livelihoods of indigenous and traditional communities for generations. Amazonian-nut is also an important tropical forest commodity. In Brazil, particularly during the past two decades, community-based Amazonian-nut forest management and enterprises have been key strategies for promoting biocultural conservation and sustainable development. More recently, several Amazonian-nut partnerships – with a diverse set of actors from communities, NGOs, government, and business – have been taking shape, aiming to advance collaboratively and creatively the value chain development of this important tropical forest resource. This study highlights and discusses how social innovation and entrepreneurship have been applied to help overcome some of the many challenges confronted by these community-based initiatives and their supporters, offering insight for future Amazonian-nut sustainable business partnerships and biocultural conservation.

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Biocultural Rights, Indigenous Peoples and Local Communities Protecting Culture and the Environment

We would like to have the opportunity to present our book in this joint meeting as its subject is very relevant for both institutions, the SEB and the ISE. The book should be released the 2nd of June, just for the congress. This volume presents a comprehensive overview of biocultural rights, examining how we can promote the role of indigenous peoples and local communities as environmental stewards and how we can ensure that their ways of life are protected. With Biocultural Community Protocols (BCPs) or Community Protocols (CPs) being increasingly seen as a powerful way of tackling this immense challenge, this book investigates these new instruments and considers the lessons that can be learnt about the situation of indigenous peoples and local communities. It opens with theoretical insights which provide the reader with

foundational concepts such as biocultural diversity, biocultural rights and community rule-making. In Part Two, the book moves on to community protocols within the Access Benefit Sharing (ABS) context, while taking a glimpse into the nature and role of community protocols beyond issues of access to genetic resources and traditional knowledge. Finally, the third part of the book considers whether BCPs/CPs can be seen as political tools and representational strategies used by indigenous peoples in their struggle for greater rights to their land, territories and resources, and for more political space.

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Affective ecology of Andean potatoes

In the Peruvian Andes, farmers cultivate landraces potatoes (*Solanum tuberosum*) resulting from a long process of domestication and selection. During this 8000-year history (Dillehay, Bonavia, and Kaulicke 2004), they have developed a special relationship with their tubers; they are companion species (Lieutaghi 1998; D. J. Haraway 2019). In this chapter, we will focus on the affective dimension of this relationship, following the lead of various authors (Hustak and Myers 2013; Daly 2021; Archambault 2016; Mboka Ingoli 2020). Using data collected in the Cusco region, we propose to focus on the affective ecology of the potato (Hustak and Myers 2013). We will see that the potato is considered to be a sentient being, and we will explore the network of intra- and extra-specific relationships in which they are involved. We will show that the emotional state of tubers refers to a pragmatic and ethical evaluation of human engagement towards other-than-human beings, including potatoes.

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Forest spirits and smartphone apps: digitising biocultural heritage across Africa for indigenous rights and biodiversity revival

As the climate and ecological crises escalate, predictions of the impacts for different populations have been mapped. These reveal that sub-Saharan Africa is the most vulnerable, a region which supports a significant proportion of the world's biological and cultural diversity. Africa's indigenous peoples, the oldest of human groups, represent the most vulnerable demographic due to their high reliance on 'wild' resources, and the rapid degradation of their cultural systems. The inseparability of nature and culture held in their ontologies demonstrates the importance of revitalising and engaging biocultural heritage as a means to strengthen communities and the rich landscapes of which they are an intrinsic part. Through participative technology, from resource and land mapping to participative video, indigenous communities have increasing opportunity to create and participate in projects led by local values. To take this concept further, anthropologists, geographers, and computer scientists from the Extreme Citizen Science group (ExCiteS) are combining long-term ethnographic research with biocultural technology design to build indigenous-led mobile data collection tools. Based firmly in local values and concerns, the Baka of Cameroon, Ju|'hoansi of Namibia, and Maasai of Kenya are utilising the Sapelli software for a broad range of projects including reporting wildlife crime, monitoring animal movements and plant harvesting rates,

recording ethnobotanical knowledge, and documenting human rights abuses. Barriers of illiteracy and geographical remoteness are crossed by building Sapelli with icons, designed by community members themselves, and by establishing local management with data sent to partners through mobile internet and SMS.

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Territories with memory: biocultural networks and agrobiodiversity in the southern Andes

Biocultural networks are complex and simpoietic. From the relationships between actors, as nodes of a network, agrobiodiversity is mobilized and biocultural memory is generated as an emergent property of the local agricultural system. This memory is acting through spatial and temporal scales and is carried by memory repositories that range from seeds, through homegardens and their tenders, to entire territories. In the southern Andes, the homegardens of Mapuche and non-Mapuche campesinos coexist with those of an increasing number of migrants. We explored the agrobiodiversity and biocultural networks in 100 homegardens (50 kept by campesinos and 50 by migrants) in the La Araucana Region, Chile. Using a mixed-method approach (plant inventories, interviews, focus groups, and participatory dialogues), we found an extraordinary diversity of cultivated plants in homegardens, including 284 species and 543 ethnovarieties. Plant diversity was greater in migrants' homegardens. Knowledge of landraces was higher in campesinos while migrants were more proficient in managing modern varieties. However, and regardless of their origin, farmers who actively participate in seed exchange practices or “trafkintu” had a higher knowledge of agrobiodiversity. We found that seed exchange practices mobilize both agrobiodiversity and knowledge across scales while nurturing local biocultural memory. While migrants are a source of agrobiodiversity and innovation, campesinos are a source of local expert knowledge and traditional varieties with adaptive potential to socio-environmental changes. We have implemented co-learning and educational actions to favor simpoiesis or collaboration among farmers, agrobiodiversity conservation, and food sovereignty in intercultural contexts of southern South America.

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Looking for traces of medicinal plants used by the African diaspora for syphilis and yaws in Jamaica under plantation slavery

This paper explores the challenges in recovering evidence of medicinal plant use by enslaved people from the colonial archive, focusing on examples of treatments for syphilis and yaws in Jamaica in the long 18th century. Both diseases were common and appear regularly in case notes and botanical profiles in manuscripts published by British physicians who spent time in Jamaica. Two of the most commonly recommended plants by these physicians were China root and/or sarsaparilla (*Smilax* spp.) and Guaiac (*Guaiacum* spp.). While knowledge of these plants was first learnt by the Spanish from Indigenous peoples in the Caribbean, they became incorporated into European Materia Medica. Knowledge of medicinal plants held by Indigenous and African peoples in the Caribbean was seen as a potential source of survival for colonists in a new tropical

environment, and for commodities for colonial enrichment. At the same time, within the hierarchies of knowledge established within the white supremacist political economy of plantation societies, this knowledge was also devalued and dismissed in manuscripts published on botany and medicine. This epistemic violence means the diverse ways enslaved and free people of African descent in Jamaica had of healing and caring for themselves and their kin rarely survives in the written record of the period. In addition, this knowledge could also be protected from being discovered by the enslavers, as it was a source of survival, spiritual sustenance, and resistance for the enslaved. These issues will be explored by examining some of the traces that do survive.

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Ethnobotany of Tajikistan – preliminary studies, possible potential and future prospects

To date, the authors of this project have realised three research topics on the analysis of the useful flora of Tajikistan. Preliminary ethnobotanical research conducted in 2021 in the Ishkashim region in localities along the Silk Road (route through the Wakhan Corridor) resulted in the creation of a database of 190 taxa of wild plants used by local people. These results represent the longest recorded number of useful plant taxa from this region to date. Among the plants recorded as used by local people were species such as the endangered *Echinops wakhanicus* as well as *Thermopsis alpina*, and endemic species such as *Phlomis schugnanica* or *Rosa huntica*. We were able to establish that the Tajik flora includes 1826 species with so far confirmed useful properties. Research on the inventory of crop wild relatives (CWR) has resulted in a list of 549 species, belonging to 36 families and 125 genera found in the country. Of these, 71 taxa were identified as native close relatives of globally important crop plants, 67 as distant native relatives and 411 as native taxa of undetermined affinity. The number of 411 species with undetermined affinities to major crop species may be evidence that further work is needed in Tajikistan to understand its natural CWR heritage. This can be done by analysing their traditional use in the region, which will help to determine the potential value of these plants as genetic resources for global crop improvement. This assessment may also have an impact on their local conservation.

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Medicinal plants and health sovereignty in Badakhshan, Afghanistan: Diversity, stewardship, and gendered knowledge

Medicinal plants are fundamental to health sovereignty, providing vital healthcare and livelihood options for rural mountain communities. We conducted 284 interviews with 416 participants in Badakhshan Province of northeastern Afghanistan focusing on the collection, use, sale, and management of medicinal plants. Participants identified 48 plants within 45 categories of treatment and prevention. The greatest number of plants were used to treat hypertension (14 plants), followed by kidney aids (12), analgesics

(11), gastrointestinal aids (11), and dermatological aids (9). Comparisons with hospital records suggest that medicinal plants treat common ailments and preempt the need for some hospital visits. In addition, medicinal plants provide a source of livelihood for approximately 25 % of participants. Many gatherers are concerned about the impacts of harvesting on medicinal plant resources. Collaborative research and knowledge exchange are necessary to enhance health sovereignty and community-based stewardship that sustain medicinal plant diversity in the context of increasing commercialization.

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Diachronic comparison of medicinal plants sold in the Tianguis de Ozumba, State of Mexico, Mexico

A diachronic study in a traditional regional market (“tianguis”) in central Mexico revealed changes in the diversity of medicinal plants in terms of species richness, anthropytic associations and remedial uses. During the years 1994 and 2004, weekly inventories of medicinal plants in the wholesale section of the Tianguis de Ozumba, State of Mexico, consisted of: a) taxonomic census of plants presence, b) collection of botanical specimens, c) photographic documentations, and d) semi-structured interviews focusing on the names and uses of plants. Based upon the data matrix of presence-absence and uses, the taxa were grouped with Jaccard coefficient and analyzed hierarchically by UPGMA. The dendrograms of 1994 and 2004 were compared and the permanency categories were identified: C1 and C2 persistent, C3 reduction, C4 and C5 disappearance, C6 increment, C7 and C8 appearance in 2004. Each category was scored for the following aspects: Management gradient (spontaneous-cultivated), Life form (herb, shrub, tree, etc.), Life cycle (annual-perennial), Domestication gradient (wild-domesticated), and Use. Most of the plants belonged to different families, but the most important were Asteraceae (16%) and Lamiaceae (14%). Results indicated that the persistent taxa with the greatest presence throughout the years were characterized (in order of importance) as: cultivated, domesticated, herbs, and perennials. The discontinued species required irrigation from mountain springs suggesting that their abandonment was related to the extinction of local glaciers. Their employment in traditional medicine as simple preparations or in herbal mixtures was associated with the following systems: digestive, genito-urinary, respiratory and skin disorders.

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Reindeer lichen landscapes in Alaska

Reindeer herding was introduced to Alaska in 1893 as an attempt to increase the food security of Alaska Indigenous peoples through reindeer pastoralism. It was a multicultural ordeal that brought together Iñupiaq and Yup'ik men who apprenticed as herders and Sámi pastoralists from Scandinavia who, together with various representatives of US-based authorities, acted as advisors and supervisors for the endeavor. Archival documents point to differing conceptions of the landscape and *Cladonia* lichens in Alaska. During winters, reindeer subsist mainly on lichens, *Cladonia rangiferina*, “reindeer lichen,” being the most iconic one. For the immigrant Sámi

reindeer herders who came from depleted pasturelands of Norway, the prevalence of *Cladonia* lichens was a welcome sight: “Reindeer would never starve in this country.” What archival sources tell about the divergent cultural understandings regarding lichen landscapes and what kinds of pasture management practices it led to is explored in the presentation.

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The Ethnobotany and Biogeography of an Archipelago: An Example of the Adriatic Islands

Island archipelagos have played an important role in shaping some of the paradigms of biology, but patterns of knowledge about plant uses in archipelagos have never been quantitatively analysed. We performed ethnobotanical studies in 36 islands in the Adriatic Sea (nearly all the inhabited islands). Our main aim was to document the wild food plants used. Additionally, we asked about plants used for medicine, rituals, animal fodder and making tools. Altogether over 300 interviews were made. In this presentation we will focus on the results concerning wild vegetables in 15 largest islands. We tried to establish if such variables as island size, population size, flora or its isolation are correlated with the number of wild vegetables used. Altogether the use of 89 species of wild vegetables has been recorded. The studied variables had a small and statistically insignificant effect on the wild vegetable list length. The most visible effect was an increasing trend from north-west to south-east, overrunning the typical biogeographical island patterns. Moreover, one of the large and well-populated islands, Korčula, showed an ‘unusually’ high level of wild vegetable use. The recorded relationships between the demographic and geographical features of islands were statistically not significant. We assume that cultural and historical factors diversifying the use of plants in particular islands are stronger than the abovementioned measurable variables. In the presentation we also report preliminary findings on other use categories of wild plants in the islands. The research was financed by the National Science Centre in Poland (NCN) [2015/19/B/HS3/00471].

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Investigating Ethnobotanical Abortions in Central Mexico during the Marea Verde

My dissertation investigates the social and biochemical dimensions of ethnobotanical practices that induce abortion through use of medicinal plants. This work takes place during a crucial period of social unrest that arose from a lack of reproductive health services and rights. This movement known as the Marea Verde (The Green Tide) is crucial since the spread of COVID19 increased child pregnancies, femicides, and domestic violence (Huerta, 2020; Espino & Morales, 2020; Murray & Moloney, 2020). My current investigation allows me the opportunity to improve educational content for younger generations in Mexico and the US about women's reproductive rights, the struggle to change policy, and the cultural and political acts of rebellion against current policy. In terms of the social dimensions of ethnobotanic practices, I will investigate if communities depend on these abortion practices to resolve inaccessibility to reproductive health services, limited rights, or to retain cultural practices. In terms of

plant biochemical aspects, I will research the active principle in plants that are responsible for inducing abortion. My research design focuses on three objectives that investigate the intricacies of abortifacients in central Mexican communities during the Marea Verde. First, I will overlay spatial data of ethnobotanic abortion practices onto reproductive health services to determine spatial patterns. My second objective investigates: what plant species, what plant parts are used, and how these practices interact with the Marea Verde through interviewing. My third objective will aim identify the active principles in the most frequently used plants for abortion, through mass spectrometry.

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Food insecurity in a biodiversity hotspot? Cases from South African Fynbos

South Africa's Cape Floristic Region (CFR) is simultaneously one of the most biodiversity-rich biomes in the world, and home to some of the oldest human agricultural settlements in South Africa. Local residents with generational ties to the land still retain local ecological knowledge about the natural Cape Fynbos veld, and in many cases, continue a historical reliance on subsistence agriculture. Our recent research suggests unprecedented food insecurity in Act9 rural villages of the CFR. Our question is whether agricultural hubs of the historical Cape are indeed food insecure in contemporary times, and why. Further, we ask whether food insecurity is causing local resource-poor people to return to wild food harvesting from Fynbos natural vegetation. If this is the case, harvestable veld foods may be at risk of over-harvesting, raising conservation concerns for species that hold economic and ecological value from local to global users. Lastly, we consider opportunities for cultivation of indigenous local species, and potential for their uptake as cash crops.

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Modern Markets: evaluating orchid trade at technological frontiers

E-commerce and the patenting process are forums that show commercial valuation of wildlife and information that can inform species conservation. Orchids dominate international wildlife trade restrictions under CITES, and have specific protective legislation at national level in many countries. Yet, orchids continue to be a significant component of wildlife trade in both volume and value of material sold. Using salep, a compound product made from several genera of orchids—*Anacamptis*, *Dactylorhiza*, *Himantoglossum*, *Ophrys*, *Orchis*, *Serapias*—that grow in the Mediterranean region and are wild harvested for trade, the extent of orchid trade is explored using an e-trade web crawler and patent analysis. Using a web crawler to record items sold, found orchids traded outside of their areas of distribution, and a significant gap in price between wild collected orchids and cultivated orchids. Online platforms have started integrating pop-up warnings to consumers on searches for some wild animal products, orchids and other plants that would also benefit from similar protective measures. In this first application of patent analysis as a method for exploring commercial interest in wild harvested species it is shown to be a useful method for wildlife trade research, and a horizon scanning tool for conservation. Observing salep via patent analysis served to

broaden knowledge on the range of products and processes using properties of orchids, an evolution of plant uses. Salep is not restricted geographically, culturally, or temporally as a traditional food and remedy in Mediterranean cultures. Over 163 years of commercial interest in salep orchids spans their use in food, drink, pharmaceuticals and materials.

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Centripetal political contexts can foster wild food plant knowledge homogenization

Local ecological knowledge evolves according to several socio-ecological and economical drivers. The role of policies in shaping local ecological knowledge is a still-underexplored corner of ethnobiology. Eastern Europe, which had shifting borders during the XX century, represents an ideal context to understand how policies (i.e. those implemented by the Soviet Union) affected the use of wild food plants. Better understanding the mechanisms of change of the local ecological knowledge related to plants can be crucial for promoting policies able to sustain biological and cultural diversity. Therefore, we aimed to explore the effect of the policies of the Soviet Union on the local ecological knowledge related to the use of wild food plants. We collected 584 semi-structured interviews among 18 ethnic groups living in four border regions of eight eastern European countries. We documented the use of over 170 wild food plants belonging to more than 45 families. The Jaccard similarity index revealed that the communities living across the Soviet/Non-Soviet borders (e.g. Karelians living in Finland and the Russian Federation) show lower commonalities than those who were equally included in the Soviet Union (e.g. Setos living in Estonia and the Russian Federation). Moreover, interviewees of the different groups (Karelians, Setos, and Russians) living in the Russian Federation share high numbers of detailed use reports. We argue that the Soviet Union may have promoted the use of some plants fostering knowledge homogenization. This finding contributes to promoting policies able to valorise the richness of local ecological knowledge rather than its homogenization.

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Ecological functional diversity predicts nutritional functional diversity in complex agroforests

Two of the largest global challenges - biodiversity loss due to agricultural expansion and the rise in diet-related noncommunicable disease mortality, both exacerbated by climate change - are inextricably linked through our food systems. Agroecological approaches to food production strive to fulfill linked environmental and human health goals, but our understanding of these linkages and their underlying mechanisms remains poorly understood. In agroecosystems, the functional diversity of species traits is important for resilience to shocks and disturbances. Analogously, the functional diversity of food species nutritional traits is important to human dietary health and disease resilience.

Using an innovative application of functional diversity indices we demonstrate how measures of ecological functional diversity predicts nutritional functional diversity in complex agroforestry systems. Managing for and maintaining a diversity of plant traits in agroecosystems has direct benefits for human nutrition.

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Breadfruit Yield Study in Jamaica: Implications for the Development of a Sustainable Value-chain

Breadfruit is ubiquitous throughout the Caribbean, where it has been an important food source for over 200 years. Many regional dishes use freshly harvested breadfruit, but its economic value and potential to increase food security and reduce reliance on imported foods has not been fully realized. With recent advances in the production of shelf-stable flour and other breadfruit products, there have been emerging opportunities geared toward increasing its importance as a superfood. However, in the absence of reliable data on yield and good agronomic practices, farmers, food processors, and distributors are reluctant to invest in breadfruit, despite new and emerging marketing opportunities. This yield study utilized a citizen science approach for data collection across five Jamaican Parishes. Data from over 50 bearing trees, representing four different varieties (Yellow-Heart being the dominant type) were included with the following aims: 1) collect data on yield over a two-year period, 2) identify peak breadfruit bearing seasons, and 3) contribute to the development of a GPS-tagged location map of breadfruit-producers throughout the country. Agronomic or climatological data, such as rainfall, fertilization, soil conditions were collected. Preliminary findings identified a major bearing season for Yellow Heart from June to September, while other cultivars peaked at different times. A minor bearing season occurred around February to March. The preliminary results of the study and the implications for the development of a sustainable value chain for breadfruit in Jamaica will be the subject of this presentation.

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Back on the trail of archaeobotanical evidence for ancient psychoactive drug plant use in Eurasia

From ancient times, a variety of plant and fungi sources of psychoactive substances have been used by humans. Motivations for such use have included desires to heal or provide support in daily work, as well as to escape from life's harsh realities and inspire the ritualized development of spiritual beliefs. Although there are a relatively large number of drug plants and fungi that are regarded as having had ancient mind-altering relationships with humans, only a few have been well documented in the archaeological record of Eurasia. Examples referred to in this paper include (1) species in *Ephedra*, a genus generally categorized as comprised of stimulant plants, (2) *Cannabis*, a genus of closely related multipurpose plants that are sometimes classified as hallucinogenic or entheogenic, and (3) *Papaver somniferum*, the opium poppy species classified as an archetypical narcotic. All the plants, or their psychoactive secondary metabolites, that are highlighted in this study have drug use histories of varying praise and disapproval. However, their traditional and modern use patterns of medicinal and spiritual importance should not be obscured by their shifting status from the sacred to the profane. Shining

some light on archaeobotanical evidence of their past use and status may lessen some unjustified contempt or demonization.

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Investigation of the Anti-hyperglycemic Effects of Anecdotally Hypoglycemic Plants in Normal Healthy Sprague-Dawley Rats

Diabetes mellitus is one of the most prevalent public health threats in the 21st century. The use of traditional medicine in alleviating the complications of diabetes mellitus is frequently practiced within the Jamaican culture. However, the majority of these plants have not been scientifically validated as anti-diabetic agents. This study investigated the anti-hyperglycemic effects of the methanolic extracts of *Turnera ulmifolia* L., *Delonix regia* (Bojer ex Hook.) Raf., *Parthenium hysterophorus* L. and *Alpinia purpurata* (Vieill.) K. Schum in normoglycemic rats using Oral Glucose Tolerance Test (OGTT). The most efficacious anti-hyperglycemic plant was then extracted sequentially using hexane, ethyl acetate, and methanol. All three semi-solid crude extracts obtained were bioassayed using OGTT to determine the most efficacious anti-hyperglycemic plant extract. Of the four plants screened, *Turnera ulmifolia* produced a significant reduction in the fasting blood glucose (FBG) when compared to the control group, DMSO. *Delonix regia*, *Alpinia purpurata*, and *Parthenium hysterophorus* caused no significant reduction in the FBG levels when compared to their respective control groups. The methanolic extract of the most efficacious plant, *Turnera ulmifolia*, following sequential extraction, produced an overall reduction in the blood glucose level which showed statistical significance ($p < 0.05$) at 60 min when compared to the control group. To conclude, there is increased potential for the methanolic extract of *Turnera ulmifolia* to be used as an anti-diabetic agent.

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Medicinal plants and sustainability: Approaches to developing sustainable exploitation system and management of *Prunus africana* in Cameroon

Many rural households as well as small and medium-scale enterprises depend on this resource for their medicine, construction needs and income. It is also a significant source of revenue for the state. Its bark has been traded internationally for over 50 years.
The over exploitation and illegal harvesting of this species have lead to the species being considered as vulnerable and included in the "Red List" of the International Union for the Conservation of Nature and Natural Resource, and Annex II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora. The route is all clear and it needs to be followed to ensure the survival of this species upon whom the livelihoods of many people and the health of prostate patients scattered around the world depend.
It has been reported that more than 3.6 million *Prunus africana* trees have been planted on farms, since 1976 in Cameroon, (Awono, 2008; Tientcheu , 2007; Nkuinkeu 1999; Cuningham and Mbenkum 1993).

Prunus africana management has always been governed by customary and statutory laws. In the case of *Prunus* some failures or shortcomings have been observed in the regulations. This work is not only designed to review the existing framework for *Prunus africana* exploitation, commercialization and trade as well as cultivation in Cameroon, but also makes recommendations for actions.

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Ethnobotany of Vietnamese papermaking and paper arts

Paper—flat sheets of pulped plant fibers used for art and writing—was first made in China over two millennia ago. Though its discovery was initially guarded, papermaking technology eventually spread to other parts of the world, including Korea, Japan, and Central Asia by the 8th century, and Europe by the early second millennium CE. Like an intercontinental game of telephone, each culture modified pulping and sheet-forming tools and processes and tailored them to locally available plants to birth their own distinct kinds of paper. Despite a near-total replacement by cheaper, machine-made paper today, some countries still make paper by hand, following their centuries-old traditions. However, hand papermaking knowledge is still incompletely documented, including in the country with the second-oldest history of making paper: Vietnam. In this talk, I will focus on the unique plants involved in Vietnam's 1600-year-old papermaking traditions (including those used for papermaking tools, for provisioning mucilage, for paper fiber, and for making block prints) and contrast them with the species used in other Asian papermaking traditions. I then conclude with the present conservation challenges facing Vietnamese hand papermaking, and some possible solutions to help these ancient traditions survive into the 21st century.

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Fire and Morchella: Ethnoecology of Morels in the Boreal Burn

During certain summers in Alaska, when vast areas of the forests become overtaken by wildfire and most residents complain about the smoke, a relatively small (but growing) segment of the population becomes full of anticipation. That is because the hyphae of certain species of the fungi genus *Morchella* tend to proliferate abundantly in forest soils in the year following the forest fire. Under favorable conditions, such mycelia produce varieties of *Morchella* sp. mushrooms known collectively as “fire morels.” During the fire season, the hopeful morel hunters, pursuing the crop for both commercial and subsistence purposes, look at the calendar to note the dates of the burn; they study the maps to check on road access, sun exposure, vegetation, terrain; and later in the year they return to the website of the Alaska Fire Service to monitor the size of the burn. We have been part of the Alaska morel hunter community for over twenty years. What we share in this paper is insight from the observations of local foragers on the interdependence between the intensity and seasonality of the fires and the success of the hunt.

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Talking Food in Odessa, Ukraine: A Tribute to My City in the Time of War

Since the invasion of Putin's army on February 24, 2022, my native Ukraine has seen so much suffering, destruction, and death. Yet, amidst the turmoil and extreme uncertainty, the vendors at the food markets in the southern city of Odessa (still partially operational at the time of writing) continue to tell the journalists, bloggers, and anyone who will listen "come to Odessa and we will make sure you eat better than you ever had before!" Inspired by this empowering show of resilience tied to food, I take the opportunity to share an analysis of the Odessan cuisine through an integrated lens of ethnobiology, anthropology, linguistics, and aesthetics. Sharing some of the common core with the foodways of other regions of Ukraine, as well as Russia, Belarus, and parts of Eastern Europe, Odessan cuisine is recognized as unique not just by the city's residents but through much of the ex-Soviet space. Odessa's identity as a multicultural city, which connects one of Black Sea's large urban seaports with the hinterland sites of Ukraine's large agricultural production; the rich local foraging and horticultural traditions celebrated at its food markets, and the history of Greek, Turkish, Caucus, Jewish, Central Asian, and Korean heritages represented among the city dwellers — all provide a fertile ground for culinary fusions. Still, the distinctiveness of the Odessan cuisine is apparent not only in the ingredients and recipes it features, but also in the vocabularies and visual and performative elements connected with preparing, serving, and sharing food.

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Camu camu fruit harvests in Western Amazonia: Success and concerns for a long-term community resource management effort

This study examined the economic harvest of large wild stands of camu camu (*Myrciaria dubia*) fruit trees over a 15 year period in northeastern Peru. The fruit harvests were managed by two local communities during the first years and then a single community for the subsequent 13 years. *M. dubia* is a small tree with a patchy distribution native to riverine and floodplain environments of lowland Amazonia that has been subject to decades of annual harvest pressure in the study area. A previous study of fruit production from a small sample of camu camu trees in another location estimated fruit production at 9.5 – 12.7 t/ha/year. Our results show that the actual amount of fruit harvested for sale was far lower, with strong variance in annual fruit production, and with most earnings from the fruit sales going to urban centers. However, local efforts to manage the trees and the fruit harvests have been successful, representing a sustained community conservation effort, even as concerns over camu camu fruit production and climate change worry local residents.

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Unraveling vernacular names of Maroon rice varieties in Suriname and French Guiana

Rice is a keystone crop in all Maroon communities: it was probably one of the reasons why marronage was successful. The Dutch started growing rice as bulk food for enslaved Africans in 1687. Expeditions sent out to capture Maroons mentioned the first

provision fields with rice in 1711. Nowadays, Maroons cultivate hundreds of traditional varieties. Unraveling variety names will shed light on the history, farming systems and spiritual significance of rice in maroon communities. We interviewed 38 rice farmers (95% female) and collected 183 rice specimens, and built a database with 259 unique rice names. This presentation describes the links of rice names to Africa, animals, plants, morphology or agronomy, to particular groups of runaways and other ethnic groups. We found that 23,2% of all rice names are associated with women, specific (historic) persons or women in general. The process of naming a rice variety is complex, but it seems to be uniform among the six different Maroon tribes and more than 100 villages. This means that the naming system was developed before marronage on plantations or memorized from Africa by enslaved rice growers. In Maroon farming systems, women do the planting and harvesting, men open and burn the field. In their struggle for freedom, men were needed to protect the newly formed villages, leaving them no time for farming. Possibly, some of the early maroon women came from female-based rice growing communities in western Africa.

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Emerging Technologies in the Ethnobotanical Approach to Drug Discovery

Of the 374,000 species of plants on Earth, roughly 9% of these have been used in traditional medicine. Yet, most of these remain unstudied by modern science. The Quave Research Group takes an ethnobotanical approach to natural products discovery, focusing on species used to treat infectious and inflammatory diseases in traditional systems of medicine. The Quave Natural Products Library (QNPL) comprises 2,500+ extracts derived from 700+ species collected from around the world under appropriate international collaborative agreements and permits. Here, I will present examples of some of our recent discoveries of bioactive natural products as case studies in the application of emerging analytical tools for the chemical characterization and pharmacological evaluation of medicinal plants. I will share our approach to compound discovery, from classic bioassay-guided fractionation techniques using analytical chemistry tools (LC-HRMS, NMR, single crystal X-ray diffraction) to emerging technologies enabling the evaluation of complex mixtures by CryoEM/MicroED.

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Color symbolism and African continuities in Jamaican stories of the duppy Rolling Calf

Color symbolism is as important to the peoples of the Caribbean as it is to human beings everywhere. In the Caribbean, the subject has been explored in relation to human biological variability, the ackee and cultural and political symbolism, and in relation to human body fluids. Here we examine from an ethnobotanical point of view the color symbolism associated with African continuities in Jamaican stories of the duppy Rolling Calf.

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Assessment of bioprospecting and biopiracy in the Caribbean

The extent of modern bioprospecting within the Caribbean biodiversity hotspot has not previously been assessed. This paper summarizes the findings of a consultancy commissioned by eight governments, and coordinated by the International Union for the Conservation of Nature (IUCN).

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Tortillas in the Snow

This paper analyzes the menus of Mexican-owned restaurants in Anchorage, Alaska, a city located above the 60-degree North latitude, which has a subarctic climate, with very short summers. The essential Mexican staples do not grow here. However, the lack of ingredients has not stopped Anchorage's Mexican diaspora from developing a unique cuisine that combines Mexican cooking methods with local ingredients. Anchorage's Mexican diaspora does not come from a single region. Mexican immigrants enjoyed a wide variety of dishes when they lived in their homelands, and those dishes were not the same for everyone. There is no consensus, for example, on which are the quintessential dishes of Mexican cuisine or what ingredients a particular sauce should use. Anchorage's Mexican cuisine combines features from many regions within Mexico. It also introduces elements from Tex-Mex gastronomy, a culinary phenomenon originally from Texas that shares ingredients with Mexican cuisine. Paying attention to the ingredient combinations, cooking methods, regional origins, additions, and misunderstandings that have made the Mexican-Alaskan culinary scene unique, the paper discusses how the community's identity has been tied to the rise of such a distinctive cuisine.

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Sex in the orchard: wild variability in American Persimmon flowers

While variation can fuel evolutionary flexibility and creativity for biotically pollinated species, variation in floral traits has long been argued to be maladaptive as even subtle changes can disturb plant-pollinator interactions. Dioecious species, species characterized by separate male and female individuals, display an extreme form of sexual dimorphism that complicates the investigation of floral variability. Even more challenging, variability in reproductive systems is a common impact of artificial selection in managed dioecious trees. American persimmon (*Diospyros virginiana*) is a native fruit tree with a long history of use and management prior to European arrival in the Americas. We quantified variation in 13 morphological characters from 400+ flowers from wild and cultivated American persimmon trees to investigate the interactive effects of natural selection in biotically pollinated dioecious flowers and artificial selection for increased fruit production. Analysis reveals a surprising amount of variability in American persimmon floral structure and sex expression in both cultivars and wild trees, with the greatest variability expressed in male cultivars. The data suggests that artificial selection is also leading to different correlations of sex-related floral characters than seen in wild trees. Beyond enhancing our theoretical understanding of historical ecology, this research can inform conservation and agricultural landscape management, and guide us in identification of useful native species for future crop development.

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Ecological calendars for food sovereignty: The contributions of plant knowledge to climate adaptation

Some of the greatest challenges resulting from anthropogenic climate change are due to increasing variability in the timing of seasonal processes. Knowledge about temporal relationships between plants, other organisms, and abiotic phenomena may facilitate climate adaptation. Ecological calendars combine place-based knowledge and climate science to synchronize human activities with local ecosystems. As part of an international collaboration exploring the potential of ecological calendars to anticipate climate change, we are conducting participatory research with seven Dakota and Lakota communities in the Standing Rock Nation. Community-specific ecological calendars emerging from this work feature plants as seasonal indicators and cues for a wide range of food system activities. Furthermore, knowledge of synchronies and sequences in the development of plants enable Indigenous gardeners and gatherers to adapt to climate variability. Given the persistent impacts of settler colonialism on their ecological knowledge, the process of co-generating ecological calendars may support Indigenous efforts to revitalize food sovereignty in the context of climate change.

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Conservation and Management of Tree Ferns (*Cyathea* spp.) in Jamaica by the National Environment and Planning Agency

In Jamaica, there are 11 endemic tree fern species (*Cyathea* spp.), which are restricted in distribution to the Blue and John Crow Mountains National Park (BJCMNP). Ecologically, tree ferns are speculated to play a significant role in the regulation of microclimate in montane cloud forests. In some ecosystems, the roles played by the tree fern species are found to be so essential to the survival of other species and the regeneration processes of the ecosystem, that the plants are considered to be keystone species. Globally, declines in tree fern populations have been documented and are primarily attributed to habitat loss and over-exploitation for international trade. Due to a lack of available research on the distribution and population size of Jamaican tree ferns, it is difficult to determine the specific challenges facing each species found in the island. To address the need for conservation and sustainable management of the species and its habitats, the National Environment and Planning Agency developed a Tree Fern Management Plan (2020-2030). The strategies outlined in the Plan will be implemented under a Natural Resources Conservation Authority funded project that is set to commence June 2022. The activities include engagement of partner agencies, execution of quantitative surveys in the BJCM and publication of public education material as major targets. The success of these strategies will be instrumental in filling major gaps in documentation and recognition by providing the data necessary to inform effective conservation action and regulate equitable and sustainable use of the species in Jamaica.

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The Heart of the Emerald Triangle: Women in the Cannabis Industry

This paper provides a view into the prominent role women have in the cannabis industry of the Emerald Triangle, an area in northern California that encompasses Humboldt, Mendocino and Trinity Counties. Since the late 1960s and early 70s women have cultivated *Cannabis* as independent farmers, husband and wife teams, and in communal settings in this rural area. In 1996 with the passing of the Compassionate Care Act in California (proposition 215), followed in 2004 with the enactment of a set of policies and procedures to implement the legal cultivation of medical cannabis (S.B. 420), women have cultivated community health and well-being along with growing cannabis. Aligned with these values, women in the Emerald Triangle joined their male counterparts as environmental activists to save old growth Redwoods and strategically apply ecological methods to their cannabis farming practices. They have also stood up against the exploitation of seasonal women workers in the industry. Since 2016 with the legal recreational use of this psychoactive plant in California (Proposition 64), women in this region are applying their ingenuity as farmers, manufacturers, healers, educators, and community leaders. Based on 8 years of ethnographic fieldwork and interviews with women in the Emerald Triangle, predominately in Humboldt County, this paper provides a glimpse into the women's world within the cannabis industry at the Heart of the Emerald Triangle.

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Mysterious potions and herbal remedies from medieval and early modern Germany

Ancient records might provide some useful clues for the discovery of novel effective drugs and natural food preservatives to combat bacterial pathogens and inflammation. In this study, 13 medicinal plants used to treat infectious and inflammatory diseases in medieval and early modern era medicine were identified through a review of old literature and handwritten recipes. A total of 12 German herbal books from 1543 to 1957 were searched for medicinal plants used in the Middle Ages and the Early Modern period, that are often not found any more in the herbal books from the 20th and 21st century. Plant samples were then collected in the North-Eastern German region, and extracts were prepared and screened in vitro for growth-inhibitory activity against a panel of clinical isolates of multidrug-resistant pathogens and for cyclooxygenase-2/cyclooxygenase-1 inhibitory activity. In addition, a bibliographic evaluation of the studied species was performed applying the Degrees of Publication (DoP) method. Ultimately, the most promising extract was further investigated through an in situ assay for its application as a natural preservative to prolong the shelf-life of raw pork. An extract of *G. urbanum* rhizomes showed the strongest inhibitory effects against *Stenotrophomonas maltophilia* (IC₅₀: 16 µg/mL), *Escherichia coli* and *Acinetobacter baumannii* (IC₅₀: 32 µg/mL). The in situ experiments showed a 30% decrease in bacterial growth of *E. coli* on the surface of pork samples after treatment with the same extract at 64 µg/mL. This study provided scientific evidence for the potential therapeutic effects of the medicinal plants used in ancient times.

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Self-medication in wild chimpanzees and mountain gorillas - Local knowledge and pharmacological assessment

This study examined the self-medicative behavior of the African Great Apes, e.g., ingestion or topical application of medicinal plants, mushrooms or insects. Presumed self-medication was first described in the early 1960s. Today, most of the natural remedies used by great apes remain undiscovered, and only a few have been investigated for their medicinal efficacy potential. To gain insight into apes' potential medicinal use, we observed wild chimpanzees and mountain gorillas in their natural habitats in Western Uganda in: 1) the remote montane Bwindi Impenetrable Forest; 2) the moist, semi-deciduous Budongo Forest and 3) a highly disturbed unforested area in Bulindi. Many species were reported for the first time. A total of 53 plant, mushroom and insect samples were collected from sites across Uganda, extracted and taken to the lab. Here, the "traditional use" of our closest animal relatives was investigated through observational data and pharmacological screenings, including a) antimalarial assays against chloroquine-resistant *Plasmodium falciparum* K1; b) anti-nematodal assays against *Caenorhabditis elegans*; c) antibiotic assays against multi-resistant ESKAPE strains; and d) cytotoxicity evaluation against human MRC-5 lung fibroblasts. A potential overlap in knowledge and use of species between non-human apes and indigenous people were explored through surveys amongst local traditional healers. The IC50 values for the most active species ranged from 0.25 (*P. falciparum*) to 8 µg/mL (*Staphylococcus aureus*). The results may reveal novel natural remedies and drug leads that are effective in humans, therefore addressing the worldwide need for new painkillers, antiparasitics, antimalarials and antibiotics.

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Are Mayan garden forests just drifting away?

Thousands of years ago, the Maya established forest gardens around their villages to provide the products they needed, and surprisingly, we continue to see the same garden species continuing to dominate these forests today -- why? Our previous work suggested that positive feedback between seed dispersers and the garden species selected by the ancient Maya held these forests in an alternative basin of attraction. However, we had little basis for comparison. We did not know what those forests would look like in the absence of the positive feedbacks. Here we present research that explores how likely it is that the forests we see today are merely the product of ecological drift, that is, stochastic forest regeneration through random mortality, replacement, and immigration. This research uses coalescent simulations that look back in time to predict the community divergence that would be required for us to observe the current distribution of species on the landscape.

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Ethnoichthyology and Ethnotaxonomy of the Kichwa Indigenous People of Arawanu (Arajuno), in the Ecuadorian Amazon

The Amazon Basin is home to a great number of Indigenous nationalities that have coevolved with aquatic habitats and fish resulting in a precise traditional ecological knowledge. This research was designed and carried out in the community of Arajuno, in the Ecuadorian Amazon, to gather, systematize and disseminate their ethnoichthyological knowledge. Data collection was carried out through participatory workshops to identify, name and classify local fish and compile biocultural information about them. From the Linnaean taxonomic perspective, 86 taxa were identified, included in 26 families, and corresponded with 16 Kichwa ethnofamilies and 58 ethnospecies. Five classification levels were identified: (I) Aycha: unique beginner–Animalia kingdom; (II) Yaku Aycha: life form–Pisces superclass; (III) Ayllukuna: ethnofamilies–Linnaean families; (IV) Ethnogenera–Linnaean genus; and (V) Ethnospecies–Linnaean species. A one-to-one correspondence was registered between 35 Kichwa ethnospecies and Linnaean species, along with one case of over-differentiation and 21 cases of subdifferentiation (Type A: 7; Type B: 14). The Kichwa ethnoichthyological classification is multidimensional and considers attributes like skin and scales, fishbones and spines, meat quality, body shape, diet, and salience. Of the 58 ethnospecies, 38 were valued for consumption, while medicinal and spiritual uses were mentioned for 40 of them. The collected ethnobiological and ethnotaxonomical information may be critical to adapt local education systems to the Kichwa worldview, to pass down traditional ecological knowledge to future generations, to design sustainable fishing strategies and promote river conservation, and to foster a respectful, careful and conscious relationship between humans and nature.

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Hungary, Conflicts of economic and cultural origin between farmers and wild animal species in East Central Europe

The multi-faceted relationship of society and wildlife is partly shaped by local perception determined by cultural or economic factors and resulting in positive or negative attitudes. The approach taken influences the survival and the range of species, in particular species associated with extremely negative emotions. Connections between local communities and wild vertebrate species were studied in four regions within East Central Europe (in Slovakia, Croatia, and two landscapes in Romania). During the work, spontaneous manifestations obtained in semi-structured interviews aiming at the exploration of the locally known fauna were taken into account. Similarly to the global trends the perception of amphibian and reptile species is extremely negative in the area and most positive attitudes are attached to bird species. In most cases the cultural and economic perceptions are of the same orientation and similar size. When cultural and economic perceptions differ (e.g. in the case of bats), the negative tends to predominate. In the case of the non-venomous grass snake, the place of encounter is

the main determinant of perception both in cultural and economic aspect, and while it is protected by a taboo around the house, elsewhere it is immediately killed. The perception of local communities originating from cultural or economic factors have a firm impact on certain species. Examining local peoples' economic and cultural attitude provides significant help to deeper understanding about connections between local communities and species of wildlife, motivations behind the activities of society and thus has a paramount importance for development of conservation strategies.

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Ethnopharmacology of medicinal plants for Caribbean women's health

Medicinal plants are frequently used in Caribbean ethnomedicine as low-cost, culturally relevant treatments for women's health concerns. Previous ethnobotanical studies found that gynecological infections, including vaginal infections and sexually transmitted diseases, were the top women's health concerns treated with medicinal plants by New York City (NYC) immigrants from the Dominican Republic. Plants that are applied topically for gynecological infections interact not only with pathogenic bacteria but also beneficial microbes that make up the vaginal microbiota. Ideally, phytochemicals present in these traditional preparations would impact pathogenic microbes while leaving beneficial bacteria intact. However, few Caribbean plants used for gynecological infections have been studied for their chemistry, toxicity, or efficacy. The chemical composition and bioactivity of traditional preparations vary considerably based on factors such as harvest, storage, and extraction methods. *Argemone mexicana* L., a top-reported medicinal plant for gynecological infections in the NYC Dominican community, is processed and sold as different preparations. It is hypothesized that these processing differences impact the bioactivity and chemistry of *A. mexicana*. Analysis using mass spectrometry showed chemical variance between unprocessed (dry or fresh whole plants) and processed (dried, chopped, and packaged) samples. These differences are also reflected in antimicrobial screenings against pathogenic *Gardnerella vaginalis* and beneficial *Lactobacillus* species, where unprocessed specimens show more potent antibacterial activity than processed specimens. Initial data suggests that varying levels of benzoquinone alkaloids may be responsible for part of the observed activity. An ethnobotanical survey with the Haitian community in NYC will identify other culturally important plant species for laboratory investigation.

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Co-authors: Irving, Jason TW; Francis, Dennis

Cleansing and Building in Rastafari Healing: Complex Herbal Mixtures in the Hostile Environment

The United Kingdom has adopted a 'hostile environment' for immigrants, which is having particularly distressing impacts on people of African Caribbean heritage. A core feature of the hostile environment is restriction from the National Health Service. The full health implications are not known, nor are the strategies that migrants use to mitigate them. Our ethnographic research in London suggests that Rastafari healers provide much needed healthcare (e.g. divination, spiritual counseling, dietary advice, and herbal

remedies) to the African Caribbean diaspora that contributes to health sovereignty in the hostile environment. This paper focuses on complex herbal mixtures, particularly 'bitters' and 'root tonics,' which are produced and distributed by Rastafari herbalists in London. Our research on complex herbal mixtures included participant observation in Rastafari healing spaces, interviews and *reasonings* (Rastafari ritual discourse) with nine herbalists/healers, and market surveys. Most of the data discussed in this paper were collected from 2016-2018, with some follow-up fieldwork in summer 2021. According to Rastafari herbalists in London bitters cleanse the gut and blood while roots wines and tonics strengthen, energise and build the body. We also found a few herbalists who make "bitter roots," which are fermented like root tonics. However, in addition to *Smilax* species, bitter roots contain some of the purgative species (e.g. Aloes) found in bitters and have a bitter flavour profile. By embedding bitters, bitter roots, and root tonics in a holistic approach to healing that includes lifestyle and spiritual advice Rastafari healers offer hope for disenfranchised migrants in the hostile environment.

Walker, Kenneth Reginald Otero (acididius@aol.com), Binghamton University

Si No Hay Hierba, No Hay Religion (No Herbs, No Religion)

Plants, as NTFPs, have been integral to the formation of the transnational social, religious, and economic relations of the Lucumi community, which incorporated the ethnobotanical practices of African slaves in the formation of a globalized religion. Distinctive foraging and other related ethnobotanical practices continue to shape present-day urban communities. First-person narrative, ethnographic data, and historical analysis can be used to elucidate the centrality of ethnobotanical practices to the Lucumi community from the slave era to the present, underscoring the reciprocal relationship of foraging activities and ethnobotanical knowledge in the evolution of folk communities and economies.

Walker, Kim (kwalker.research@gmail.com), Royal Botanic Gardens, Kew, United Kingdom

Co-author: Nesbitt, Mark

The Botanical History of the Gin & Tonic

Tonic water has been the unjustly overshadowed partner in the famous gin and tonic but has a rich ethnobotanical history of its own. The cocktail is thought of as a quintessentially English drink, yet its origins lie in the cinchona trees of the eastern slopes of the Andes and the malarial landscapes of Asia. In this illustrated talk, centuries of legends will be analysed to reveal an interlaced history of botany, medicine, empire and drinking. Kim Walker, PhD student, DTP Royal Botanic Gardens, Kew & Royal Holloway, and Mark Nesbitt, Research Lead of Interdisciplinary Research and Curator of the Economic Botany Collection at the RBG, Kew are the authors of *Just the tonic: A natural history of tonic water* (Kew Publishing, 2019).

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Co-authors: Moola, Faisal; Lukawiecki, Jessica; Young, Rachel; Powell, Lara; McAlvay, Alex

Getting Beyond Diversity: Evaluating Compatibility between Biodiversity and Indigenous Environmental Priorities in Mi'kma'ki (Nova Scotia)

The biocultural perspective was born within the Declaration of Belem, an aspirational and bold collective communication of Indigenous Peoples and ethnobiologists, made in Brazil in 1988 and published by the International Society of Ethnobiology. When it was stated "that there is an inextricable link between biological and cultural diversity," it was taken by many to mean that there is a natural alignment of interests between biodiversity protection and the cultural survival of Indigenous Peoples and Local Communities (IPLC's). The statement went on to make a number of major demands, but what were they? In this session, I will re-evaluate the common, even viral, understandings of this major declaration and in the process reacquaint the audience with the core tenets of the Declaration we rarely hear about. I will demonstrate conceptually and through case study evidence from Mi'kma'ki (Nova Scotia) that no meaningful compatibility automatically or naturally exists between biodiversity – as it is measured and operationalized in applied ecology – and the environmental priorities of IPLC's. Results will be presented from an evaluation of the compatibilities between the Key Biodiversity Areas delineation process in Mi'kma'ki and the environmental priorities of Mi'kmaq communities. Findings will demonstrate that the structural and conceptual incongruities between biodiversity conservation and IPLC environmental guardianship can unwittingly feed conflict and advance settler colonialism. However, the biocultural perspective, if re-envisioned explicitly as an action-oriented cultural survival advocacy orientation, can help environmental practitioners reengineer their efforts in ways that support the legendary IPLC environmental guardianship through partnership and reconciliation.

Walters, Bradley Bernard (bwalters@mta.ca), Mount Allison University, Canada

The Greening of Saint Lucia

Conventional, export-oriented agriculture has sharply declined across much of the Caribbean, yet the socio-economic and environmental consequences of this decline have not been well studied. Here, I present findings from a long-term, field-based research project on the West Indian island of Saint Lucia. Like many small islands across the region, Saint Lucia's upland rural landscape is increasingly dominated by forests instead of farms. Recovering forests are dominated by native tree species, although planted species are also common, especially where agroforestry has been widely practiced. This transition has coincided with dramatic expansion of the tourism sector and a re-structuring of many remaining farms from production of a narrow range of export-oriented crops to a more diverse mix of fruits, vegetables and spices targeting domestic and tourism markets. Most surviving agricultural estates have re-configured themselves as eco-tourism destinations where restored natural forests, managed agroforests, and species-rich botanical gardens are among marquee features of the 'tourism landscape'. Like many islands of the Caribbean, farming in Saint Lucia that sustains agro-diversity has long coexisted with the monoculture of commercial crops like sugar, coconuts and bananas. As agricultural export markets shrink and tourism expands, agro-diverse farming and bio-diverse land management may be the only viable, long-term option for Saint Lucia's surviving agriculturalists.

Warschefsky, Emily (ewarschefsky@mobot.org), Missouri Botanical Garden, United States

Tree crop diversity, conservation, and domestication

Trees provide more than 1/3 of the world's most important crops and it is increasingly clear that tree crops will play a critical role in the future of sustainable agriculture. Nevertheless, crop research often focuses on annual species, leaving our understanding of the processes and implications of tree domestication poorly defined. Here, I discuss how the tempo and mode of tree domestication is fundamentally different from that of annual crops and propose that many tree species are poised for rapid improvement and introduction into our global food systems. I then provide examples of two projects focused on understanding and conserving tree crop diversity. The first project uses genomic tools to provide insight into the evolution and domestication of *Mangifera*, a tropical tree genus that includes one of the world's most important fruits: mango. Next, I introduce a new project that aims to build connections between U.S. botanic gardens and public genebank communities to promote collaborative conservation of taxa in 10 genera of North American fruit and nut trees: *Asimina*, *Diospyros*, *Malus*, *Persea*, *Prunus*, *Carya*, *Castanea*, *Corylus*, *Juglans*, and *Pistacia*. Alongside a growing body of research on tree crop diversity, these projects advance our understanding of tree domestication and conservation and refine our visions for sustainable agricultural systems of the future.

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Co-authors: Trench, Camilo; Thomas, Shanna-Lee; Maddix, Gina-Marie; Francis, Patrice; Small, Hugh; Machado, Carla; Webber, Dale; Tonon, Thierry

Use of pelagic *Sargassum* spp. compost for soil amelioration in mangrove seedling production

Pelagic *Sargassum* spp. inundations across the Caribbean began in 2011, have continued unabated and are therefore now believed to be the 'new normal'. Novel uses for the algal biomass are being widely explored. Mangroves, despite their tremendous value, continue to be lost or damaged at high rates. Mitigation through mangrove restoration can be hindered by poor soils associated with severe damage/removal along urbanized coastlines. As part of transforming *Sargassum* spp. inundation to benefit coastal communities, *Sargassum* spp. compost (SC) was assessed in mangrove seedling propagation for use in these types of restorations. Pure SC was mixed with soil/sand medium, in different treatments, for the production of *Rhizophora mangle* seedlings. After 31 weeks, height and number of leaves indicated best growth in 75% SC, while the control (0% SC) had poorest growth. Seedling health, greatest in the control group, was poorest in 50 and 100% SC. Elemental analysis of SC, mangrove seedlings and soil/sand medium indicated that most elements were higher in the SC or soil/sand medium than in the plants. Furthermore, elements like Na and As found in very high concentrations in the pure SC, were very low in the plants. Overall, low sequestration of toxic elements by mangrove seedlings, and the reported ability of mangrove soils to reduce element mobilization, indicate potential for use of SC in soil amelioration without proportional contamination of plants or coastal environments. We

therefore see potential for the use of pelagic *Sargassum* spp. blooms to support mangrove restoration, leading to increased benefits to coastal communities.

White, Alexa (alexaw@umich.edu), University of Michigan, United States

Participatory Sustainable Development and Sustainable Agriculture: A Case for Small-Scale Farms and Their Influence on Food Sovereignty

Small-scale farmers are producing enough food to feed the world, and yet we are currently living in the age of the corporate food regime. Worldwide we observe overproduction and a lack of distribution of food. The United Nations Sustainable Development Goals (SDGs) were developed to guide nations toward a sustainable future. SDGs are important because they are used as aid conditionality for developing countries and they dominate international development discourses. SDG indicators are key to measuring SDG success, however, all those under Goal 2: To end hunger were solely constructed by FAO statisticians. Many of the indicators designed for our progression towards “sustainable agriculture” (SA) have inconsistent data with many gaps. While we know market-centric views of agriculture motivate policymakers, small-scale farmer motivations and decision-making processes remain unclear. This study investigates how farmers and their stakeholders (NGOs, academics, social movements) have come to understand SA and investigates their engagement in local and international markets. This work seeks to find commonalities among stakeholder groups by using a participatory sustainable development model to reveal a minimum set of useful indicators. Using SDG 2.4.1, I examine biophysical, social, and economic factors that small-scale and large-scale farmers express during focus groups in Hawai'i and Jamaica. Biophysical farm surveys were used to better understand how groups define SA. The results will indicate how the largest gaps and most inconsistent data can be remedied with alternative indicators. I also find farmers and stakeholders from small-scale farms suggest indicators most closely aligned with agroecology.

Woodmansee, Adele (aw586@cornell.edu), Cornell University, USA

Native Maize and Climate Change: Seed Systems in San Miguel del Valle, Oaxaca, Mexico

Maize diversity in southern Mexico is threatened as climate change and sociopolitical factors limit the ability of small-scale farmers to continue agricultural production. In 2017-2019, I conducted ten months of ethnographic research on maize agriculture in San Miguel del Valle (San Miguel), a Zapotec speaking community in the Central Valleys of Oaxaca. In San Miguel, agricultural production is declining due to seasonal droughts that have increased in frequency and intensity in recent generations. Farmers who continue to plant maize use exclusively their own or locally acquired seeds of native landraces. Worsening seasonal droughts play a significant role in determining what seeds farmers plant and whether farmers choose to continue planting. Farmers plant locally sourced seeds in part because these are the only seeds that they believe will produce a harvest on their fields. This points to important interactions between environmental conditions, seed choice, and farmers' livelihoods. I contribute to existing literature on maize diversity and in situ conservation by using an ethnographic approach to describe seed saving practices and networks in San Miguel.

III. Abstracts of Poster Presentations (In-person and Virtual Presentations)

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Co-authors: Vardeman, Ella Thomas; Vandebroek, Ina; Kennelly, Edward
Ethnopharmacology of Bejuco de Indio (*Gouania lupuloides*), a Caribbean Medicinal Plant Used for Oral Health, Throughout the Caribbean

Gouania lupuloides (L.) Urb. (Rhamnaceae), is commonly used as a chew stick to clean teeth, remove plaque, and massage gums. Previous research has established that *G. lupuloides* contains antimicrobial compounds that support its traditional use. *G. lupuloides* is frequently sold as bejuco de Indio in Spanish language Caribbean herbal markets in New York City (NYC). However, as with other herbs of commerce, there is a possibility that chew sticks sold as bejuco de indio are not actually *G. lupuloides*. The overall aim of this research is to understand the phytochemistry and traditional knowledge of *G. lupuloides* as it is used in NYC, and to authenticate its botanical identity in commerce. We observed morphological differences between *G. lupuloides* type specimens and chew sticks sold as bejuco de Indio that may indicate adulteration. Dammarane saponins, such as gouanoside B, which are distinctive of *G. lupuloides*, have been tentatively identified in type specimens using UPLC-QTOF-MS. Principal component analysis indicates that at least three of the chew stick samples collected as bejuco de Indio are chemically distinct from *G. lupuloides* type specimens. Our phytochemical analysis aims to characterize a chemical fingerprint typical of *G. lupuloides* to aid in the chemotaxonomic identification of unknown chew sticks. Additionally, *G. lupuloides* extracts are being screened against microbes related to its other documented medicinal uses in the Caribbean. An ethnobotanical survey is also being conducted to understand how *G. lupuloides*, and other herbs of commerce, are used in the NYC area for oral health.

Andrews, Susan Lyn (slandrews6@alaska.edu), University of Alaska, Fairbanks, USA
Learning and Teaching about the Feral Horses of the San Luis Valley in Colorado through Wildlife Painting and Photography

This presentation highlights the outcomes of my research in the San Luis Valley of Colorado, a high alpine desert environment at the headwaters of the Rio Grande River. The Valley is also home to the Great Sand Dunes National Park Preserve, and contains marshlands, lakes, and hot springs. This ecosystem supports a diversity of species and provides the natural grazing lands to populations of antelope, deer, and elk. One of the longtime anthropogenic conditions in the San Luis Valley is a presence of unmanaged feral horses. As a wildlife artist I seek to bring awareness to ethical and environmental issues facing animals and their environment. I engage the experience of local communities, insights from a range of disciplines in humanities and sciences, as well as history and current policies of wildlife management to develop a body of work that helps tell a story to broadly inclusive audiences. The presentation summarizes my process in documenting the complexities of human-environmental interactions surrounding the horses of the San Luis Valley. Featuring the work produced during my emerging

understanding of the social and environmental issues connected with the plight of these animals, the presentation invites further conversation on how artists and scientists can learn from each other for the benefit of research, public education, and their own enrichment.

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Cannamania: An Exploration of a Cannabis Cup in Canada

Cannabis has contributed \$43.4 billion to Canada's gross domestic product and \$13.3 billion to Ontario's since cannabis for recreational purposes was legalized in October 2018 (The Canadian Press, 2022). The OCS (Ontario Cannabis Store) reported that "54.2 percent of the cannabis purchases made in the province between July and September 2021 were linked to legal retailers" (The Canadian Press, 2021).

Demonstrating that Ontario has minimized the illicit market by slashing prices and making cannabis accessible. Although the sale of legal cannabis is achieving the goal of reducing criminal activity from the black market, a new phenomenon is rising; the rush to produce high THC percentages in dry cannabis flowers. This essay is an ethnographic exploration of my experience participating in the first Licensed Producer-led cannabis cup that I followed as part of my master's research project. Although I demonstrate how the cannabis cup was not what I expected it to be (a High Times Cannabis cup extravaganza), it did provide the grounds for further inquiry regarding the legislative framework of the Cannabis Act that is worthy of further exploration. Canada legalized recreational cannabis on the basis that it would protect young Canadians by keeping the plant out of the hands of children and youth, keeping profit out of the hands of criminals, and protecting public health and safety by decreasing the risk and reducing the potential damages surrounding cannabis. Yet, with such harsh regulatory measures, a new phenomenon is rising; cannamania for the highest THC flowers.

Benites Alfaro, Nancy Pierina (pierinabenitesalfaro@gmail.com), University of Florence, Italy

Private-public Intervention in Agrobiodiversity-oriented Food Systems: Analysis of Peruvian Case

Traditional production systems have gained protection from the Peruvian environmental regulatory framework through a progressive inclusion of the concept of agrobiodiversity, in the past 20 years. Although the agricultural sector must lead the process, it is a multisectoral task. However, it is unknown how the empowerment of the theme has evolved at the national level, particularly in areas of high agrobiodiversity, focused on the Puno-Cuzco corridor, declared by FAO as Globally Important Agricultural Heritage Systems (GIAHS) in 2011. The study covers 06 historical agrobiodiversity zones (The Potato Park, Andenes de Cuyo Cuyo, Collasuyo, Marcapata Collana, Lares), which were selected according to Peruvian scientific and legal recognition of agrobiodiversity conditions; and 100 stakeholders have been selected for semistructured interviews. The study has selected 6 criteria based on the topics from the International Treaty on Plant Genetic Resources for Food and Agriculture for the characterization (2020). According to the results, national and local governments have a weak and temporal intervention compared to NGOs in research and technical intervention in the traditional production; the agrarian national sector has mainly normative and centralist participation, which is

not perceived by the conservationists, who prefer a direct relationship and trust built up over time with the extension agents; The recognition of the formation of local leadership in conservation requires the strengthening of the national agrobiodiversity groups already regulated almost 20 years ago and according to the seeds regulation on native crops.

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Co-author: Cohen, Jane

Covert Sexual Dimorphism Operative in Jamaican Pimento

Pimenta dioica is a tree crop endemic to the Caribbean and Latin American region. Traditionally it has been quite a valuable spice in Jamaican gastronomy as well as an important export commodity. This study of its floral biology was aimed at investigating dioecy between the seemingly isophenotypically mature trees. Nested within the Myrtaceae, the plant exhibits cryptic dioecy as the gender of the trees is apparent only at its annual efflorescence. Flowers from 'male' and 'female' trees showed significant differences in floral size, number of stamens, number of ovules as well as stylar morphology. Differential allocation of reproductive resources is manifested in *P. dioica* through pollen siring (maleness) as compared with fruit and seed production (femaleness), which results in the larger male flowers bearing approximately twice as many stamens as their female counterparts. However, although the male tree appears more floriferous when in bloom, the female trees actually bear more reproductive units per inflorescence. Pollen from both genders germinated optimally at 20% sucrose and were aperturate. However, it was found that the pollen germination tubes emerging from female flowers were aborted, confirming some form of functional dioecy.

Brosi, Sunshine Liberty (sunshine.brosi@usu.edu), Utah State University, Eastern, USA

Formative Assessment: The Rise and Fall of an Undergraduate Ethnobotany Programs in the United States

Despite extensive quality training of graduate students, undergraduate degree programs in ethnobotany have been limited in the United States. The first Bachelors of Science degree in Ethnobotany was offered by the University of Hawaii's College of Natural Sciences' Department of Botany in 2005 and ended in 2015. The University of Hawaii had hosted SEB's Annual Meeting in 1992 and 2001. In 2007, Frostburg State University in Maryland began the second BS degree in Ethnobotany within the College of Liberal Arts and Sciences' Biology Department. This program was discontinued in 2020. SEB's Annual Meeting was hosted in Frostburg during the height of student enrollment in 2012. Several factors resulted in the discontinuation of the program including the requirement to take summer and January classes, course frequencies of every other year, and only one faculty member teaching all the required rigorous courses. Over the course of Frostburg's thirteen-year program and Hawaii's fifteen-year program, many undergraduate students were heavily involved in the Society for Economic Botany and the annual meetings. How can the Society attract undergraduates without these core constituents? The University of Alaska, Fairbanks now has a new online Occupational Endorsement Certificate in Ethnobotany, requiring eight courses. This program replaces the previous in-person Undergraduate

Ethnobotany Certificate which began in 2015 and discontinued in 2020 which was 100% grant-funded. The relatively short life-spans of these programs is due to a variety of factors that will be discussed including the overreliance on one individual to champion the programs and a lack of clear career options.

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Following the “footsteps” of the calabash tree in the Caribbean: a story of culture, medicine, arts, and spirit

Calabash trees (*Crescentia cujete* / Bignoniaceae) are a sacred plant for many past and present cultures in the Americas: from Mexico to the Amazon to the Caribbean. They go by many common names across the range where they occur, demonstrating the value attributed to these plants and how deeply rooted they are in the Americas' cultures. The whole plant (e.g., roots to seed) has been useful to people for various medicinal, edible, material, artistic, and spiritual uses. However, the gourd-shaped fruit has been the center of attention for many preparations. Early connections to the Maya (as described in Popol Vuh, Hun Hunahpu legend) and the Taino peoples (as described in the Sea Origin Myth with Yaya) demonstrate how far back this plant has been in use and part of the landscape of the geographic Caribbean. The goal of this talk is to present initial findings and comparisons from literature reviews, stories, recipes, and field interviews conducted with different Caribbean peoples addressing the questions of: (1) how are calabashes perceived, utilized, and what attributes are selected for use?, (2) who are the people that are currently in close interaction or are the stakeholders preserving knowledge about these plants?, and (3) are there any differences or similarities across uses and values placed on the calabash across the Caribbean? Highlights of contemporary uses, modern applications, and avenues for opportunities will also be explored.

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Co-authors: Inta, Angkhana; Ngernsaengsaruy, Chatchai; Long, Chunlin

Essential oil composition of traditional medicinal *Litsea* spp. in northern Thailand

Litsea Lam. is the largest genus of the family Lauraceae in Thailand. Many ethnic groups in northern Thailand use leaves of *Litsea* species as spices and ingredients in traditional remedies. However, there have been few comparative studies of the chemical compounds from leaves of different *Litsea* species. Therefore, the aims of this study were to analyze the composition of volatile substances of medicinal *Litsea* spp. The composition of the volatile oil of *Litsea* spp. will be an essential feature for plant identification and chemical screening for use in traditional medicine. Ethnobotanical field surveys were conducted from November 2019 to December 2021 in ten villages of five major ethnic groups. Semi-structured interviews were performed with 50 key informants. The Use Values (UV) of medicinal *Litsea* spp. were calculated. Fresh samples of *Litsea* spp., with high UV scores, were collected for essential oil analysis. HS-SPME was used to describe the chemical composition of the oils. Estragole, eugenol, and methyl eugenol were the major volatiles found in the essential oils of the *Litsea* spp. samples. Principal Component Analysis (PCA) classified the *Litsea* spp. samples into two main divisions groups: i) distinctive anise, citrus aroma (estragole, geranial, and neral), or ii)

spice-like aroma (methyl eugenol, β -caryophyllene, and α -cubebene). Furthermore, this study will be used to tentatively narrow down the number of species chosen for early-stage drug discovery screening which allows for potentially providing alternative sources of medicine.

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Co-authors: Tizazu, Gebre; Boyd, Frederick; Emanuel, Machel

Ethnobotanical study of traditional medicinal plant species and indigenous knowledge by the Konso people, South Ethiopia

For thousands of years, indigenous people have developed their own localized knowledge of plant use, management, and conservation. However, this rich traditional knowledge on plant utilization was not well documented, and most of the indigenous knowledge acquired by the local people was verbally passed from generation to generation. The people of Konso in South Ethiopia use and maintain traditional medicinal plant species, according to their specific ethnobotanical pharmacopeia. This study explores the unique indigenous knowledge that enables the community to identify medicinal plants, prepare medications, and then apply the cures used to treat a variety of human diseases as dangers to their long-term use. The results of the study showed that some medicinal plant species are more popular than others. *Lepidium sativum*, *Hagenia abyssinica*, *Allium sativum* were cited by all the 80 informants for their medicinal value. 40.0% of the medicinal plant species are used in powdered form directly, while 51.4% are chewed, extracted with water, and / or with butter (17.1% each) and 8.6% are extracted with local beer. Of the herbal remedies used in the study area, 68.6% were applied orally and 31.4% were applied externally. Roots are the parts most used (35.7%), followed by leaves (32.9%), combination of parts (18.6%), root bark (5.7%), fruit (2.9%), in that order, respectively.

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Towards a comprehensive inventory of medicinal plants in southern Africa

The biodiversity of southern Africa has long drawn international attention. The region is home to approximately 24 000 plant species, of which 36,6% are endemic. It is no coincidence that this region also boasts of a rich ethnobotanical heritage, being home to diverse cultures, including the most ancient lineage of modern humans, the San people. Unfortunately, traditional knowledge is severely threatened by rapid demographic changes, poverty, unsustainable land-use practices, the invasion of alien plant species and unprecedented events caused by climate change. Two decades have passed since Arnold et al. (2002) compiled the region's last checklist of medicinal plants. Therefore, a comprehensive and up-to-date inventory of medicinal plants for southern Africa will be of considerable academic and practical interest. A quantitative survey and analysis of an updated data set of the medicinal plants of southern Africa provide a fresh perspective on the historical and current ethnobotanical practices in the area and allow for much-needed comparative studies regarding new species records and previously unrecorded uses. Preliminary results show that 3540 medicinal plant species have been recorded, of which approximately 700 are new records compared to the prior survey in

2002. The families with the largest numbers of medicinal plant species are the Asteraceae, Fabaceae, Apocynaceae, Euphorbiaceae and Poaceae. The data provide evidence of a hitherto incompletely recorded ethnobotanical heritage that urgently needs documentation. It also points out the dynamic nature of traditional plant use and the importance of studying the unique relationships between plant diversity and traditional medicine systems.

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Corrugating ethnoecological attentiveness: a pre-search methodology

To conduct ethnoecological research we open our imaginations to the contours of specific places, times, and collaborations; we educate our attention. The education of attention is the process of learning to attend to context. As researchers, the education of attention is a matter of respect: in order to imagine and collaborate toward a more just and sustainable future we must first attend to the socioecological presents with which we work. My research investigates possibilities perceived by human communities for interaction with riparian habitats of the Okanagan watershed. This requires me asking questions of both human beings, with whom I share language, as well as plant, animal, and fungal beings, with whom I do not. In preparation for my research I regularly share time and energy with the plant, animal, fungal networks of which these riparian communities are formed. In doing so, I educate my riparian attention. As a chronicle of this process I keep a public journal of photos taken while walking through and with riparian environments. These are photographs of that which catches my attention, taken without plan or premeditation. Captioning and making these photos accessible through rich descriptive text corrugates affect, weather, seasons, surroundings, and sensory information. Through this experience I explore how educating and documenting ethnoecological attention through persistent presence, before beginning research, can amplify and multiply possibilities for perception and interaction.

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Co-authors: Foronda, Edson; López, Alicia; Mamani-Mamani, Armando; Molina-Alor, Johanny; Moscoe [now Mohn] Lauren; Rioja, Roger; Rocabado-Espinoza, Carol; Sachahuaman, Ines; Tupayachi-Herrera, Alfredo

Distributions of wild, tuber-bearing *Oxalis* in the central Andes, and their bearing on the origin of domestication of *Oxalis tuberosa*

Since our previous study of AFLP data in wild, tuber-bearing *Oxalis* populations from Peru, Bolivia, and Argentina (Emshwiller, et al. 2009), we have continued collecting to improve the geographic representation of sampling of these taxa. The distributions of the Bolivian and Argentinian taxa may be continuous, and their distinctiveness from each other is in question. These were the populations supported as most similar to cultivated *Oxalis tuberosa* in their AFLP profiles in the previous study. From 2013 to 2022, we have been revisiting and expanding the areas where these taxa were previously found, to improve geographical representation of our sampling for future studies with next generation sequencing methods. The populations in central Peru and southern Peru are separated from each other, and their ranges are now better understood. None of current ranges of the populations overlap with the archaeological

site of Guitarrero Cave in Ancash Region of Peru, supporting the domesticated nature of the ancient tuber remains found in that site.

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Quantitative Indications of Plant Specie Smoked or Actively Inhaled, Grouped by Plant Family

Traditional plant pharmacopeia has involved smoking or the active inhalation of combusting plant material for medical, spiritual, and recreational purposes. Many documented cultural and medical uses of smoke were compiled by Pennacchio, Jefferson, and Havens from available literature in *Uses and Abuses of Plant-Derived Smoke, its Ethnobotany as Hallucinogen, Perfume, Incense, and Medicine*. Oxford University Press, 2010. From this text, 685 species were derived and found to be involved in direct or active inhalation by the author of this study. This figure represents a minimum number of species found to be involved in direct or active inhalation (excluding incense, fumigation, repellents, and smudges) as many grey areas exist in the compiled literature as to definitive type of usage. Over half of N 685, 51.8%, is attributed to only 11 plant Families. Roughly only 8.8% of the 125 total plant families found to be used for direct inhalation, accounts for over 50% of species utilized. These results are thought to be significant. These results bring up questions for further quantitative ethnobotany research about correlation between Family size, geographic presence, abundance in environment, as well as data from other texts or ethnographic research, current and past, that was not included in the sole source of this data [*Uses and Abuses of Plant-Derived Smoke, it's Ethnobotany as Hallucinogen, Perfume, Incense, and Medicine.*, Pennacchio, Jefferson, and Havens, 2010], and pharmacological/chemical /culturally significant properties and usage of known specie employed for smoking.

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***Annona muricata* extracts abrogate docetaxel induced cytotoxicity in normal prostate cells**

Annona muricata, locally known as soursop, has a long history of traditional use for various diseases. A survey conducted among cancer patients at the University Hospital of the West Indies, revealed that *A. muricata* was the most commonly used plant among cancer patients in Jamaica, with 59% of cancer patients reportedly using the plant to treat their cancer. The study also revealed a high prevalence of concomitant use with common chemotherapeutic drugs such as docetaxel, used in prostate cancer. On the basis of the reported prevalence and pattern of use, this study aimed to evaluate the impact of the aqueous extract of the leaf as well as the ethyl acetate extract from the bark in combination with docetaxel on the normal prostate cell line, RWPE-1. Using the MTT (3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium) assay, the impact of docetaxel alone and in combination with *A. muricata* extracts were assessed for their effect on the viability of RWPE-1 cells. Docetaxel alone yielded a toxic impact on these normal cells with an IC₅₀ of 0.0006mn; 0.00002microg/mL over a 72-h period, while when used in combination with *A. muricata* extracts, docetaxel impact was reduced; Thus, using *A. muricata* could improve the selectivity of docetaxel making it more

specific to targeting prostate cancer cells while reducing toxic impacts on normal cells. The scientific evidence suggests that it may hold promise as a viable adjuvant therapy for prostate cancer patients undergoing treatment with docetaxel and would warrant further studies to determine mechanisms of action and physiological relevance.

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Therapeutic botanicals application in reducing Dengue transmission and other *Aedes*-borne diseases

Over 300 million people are affected by diseases transmitted by the *Aedes aegypti* mosquito, such as dengue, yellow fever, chikungunya and the Zika virus. The ability of the *Aedes aegypti* mosquito to quickly adapt to changes in their environment combined with the absence of effective medications for *Aedes*-borne diseases, hinders both the control of the and the management of *Aedes* spp. transmitted diseases. While synthetic insecticides have limited efficacy in the control of mosquito populations, their wide-spread use and their effect on non-target organisms have rendered them unpopular. Plants have an array of active biochemicals and have been used traditionally for their activities against numerous maladies, insect bites or as insect repellents to prevent insect transmitted diseases. Our laboratory has demonstrated the ability of plants used in routine home therapy at reducing *Aedes aegypti* mosquito populations. Of the plant extracts tested, two organic plant extracts 1011SK and F5401F showed the greatest efficacy against mosquitoes collected from Kingston, Jamaica, previously shown in our lab to be resistant to a range of synthetic insecticides. The Lethal Dose to decrease the population of Kingston *Aedes aegypti* mosquito to 50% (LD₅₀) was 9.00 ppm and 0.25 ppm after 24 hours of plant extract exposure respectively. In our search to find effective control measures against the *Aedes aegypti* mosquitoes, we show plants as suitable alternatives to synthetic insecticides. Our next quest is to demonstrate the mode of action of these plant extracts against the mosquitoes.

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Kumeyaay white sage's extraction: led to landscape degradation

White sage has been used by native groups from the Californian region for centuries. They have developed Local Environmental Knowledge -LEK - about the management of this plant, the benefits for the environment and its role on the reproduction of their culture. This project is focused on LEK from the Kumeyaay people of San Jose de la Zorra, Baja California, México, and the current problematic around the massive white sage extraction. The LEK generated from the white sage landscape is fundamental for achieving a sustainable use of this plant following two main principles: to use only what is needed and to collect the plant in a specific season. However, the increasing popularity and demand on the international market due to its alleged medicinal and spiritual properties; which have been spread and appropriated by external actors has originated a drastic change, not only on white sage population, but on the Kumeyaay landscape as well. In addition, the environmental violence that has historically affected

Kumeyaay people has led them to be participants of the white sage depletion and landscape degradation. Additionally, the lack of employment and access to basic services has discouraged the use of LEK when deciding on their environment. As a result, a severe and uncontrolled plunder problem has not only affected the ecosystem but the cultures that, for years, have sustainably managed their traditional landscapes. Acknowledged: Gilberto Gonzalez Arce; Nubia Cortés Márquez, PhD; Sula Vanderplak, PhD; Juana Claudia Leyva, PhD

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An integrated approach to the study of orphan crops and indigenous food systems: evidence from Tropical Africa

Indigenous food and agricultural systems (IFS, IAS) have historically been key to creating and maintaining biodiversity-rich landscapes, as well as diverse and nutritious diets, in Africa. Yet, over the past decades, the African continent has witnessed a progressive abandonment of IFS and IAS, as well as significant cultural erosion, following the growing urbanisation, social transformations, and land use change. This has led to many plant varieties and landraces becoming “orphan crops” (OC) and being replaced by a narrow range of commercial hybrids, usually highly input-dependent and unable to support balanced diets. With the present work, we combine taxonomical, ethnobotanical, and historical perspectives within a pilot interdisciplinary research methodology to study agriculture, crops, and food systems within selected agro-climatic zones. By focusing on case-study areas in two African crop diversity hotspots – Ethiopia and Guinea – we aim to document traditional varieties grown by communities in different socio-environmental contexts, including endangered knowledge about their resilient traits, gastronomic use, and cultural role. We adopt participatory approaches for data collection to deepen the complex relationships between local agricultural choices, environments, and cultural preferences, as well as to capture temporal changes and explore their drivers. The production of ethnobotanical inventories of local OC and landraces will contribute to the preservation of the local traditional ecological knowledge (TEK), and the creation of a holistic framework around agri-histories and heritage will help quantifying how the abandonment of IFS and IAS are affecting agrobiodiversity, providing a strong empirical basis for future tailored conservation initiatives to be designed.

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Diversity and Value of Extant Hawaiian Sugarcane (*Saccharum officinarum* [L.]

Cultivars Sugarcane is one of the most economically important crops with particular cultural and economic significance in the Hawaiian Islands. The historical influence of sugarcane in Hawai'i tends to overshadow the fact that Native Hawaiians cultivated dozens of unique varieties of sugarcane for almost a millennium before the arrival of Europeans. Extensive ethnobotanical, morphological, and genetic investigations over a 15 year period has sought to identify and corroborate sugarcane cultivars that are uniquely Native Hawaiian. In investigating distinct traditional cultivars of extant sugarcane collections in Hawai 'i as “Hawaiian,” our findings demonstrated the need for

intimate knowledge and relationships with accessions in order to make meaningful interpretations of genetic and phenotypic data. Based on involvement with the traditional and contemporary users, we discuss the unique value of these cultivars, their potential to contribute to economics, sustainability, and the preservation of cultural heritage, and navigating potential pitfalls in the inequitable roles regarding the canes.

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A review of the ethnobotany, contemporary uses, chemistry and pharmacology of the genus *Thesium* (Santalaceae)

Many species of the hemi-parasitic genus *Thesium* play important roles in communities around the globe, but no attempt has been made to review the available literature and determine the economic importance and commercial potential of the genus. We provide a comprehensive literature review on the ethnobotany, contemporary uses, chemistry, pharmacology of *Thesium*. A total of 23 *Thesium* species (of ± 320), 17 from Africa and six from Asia, have traditional and contemporary uses. *Thesium* is most commonly used as medicines (18 species), functional foods (seven species) and charms (six species). Charm uses were restricted to southern and East Africa and contemporary uses such as functional feeds and fodders, growth mediums and fertilizers were unique to Asia. *Thesium chinense* is by far the most utilized and versatile species, followed by *T. longifolium*. As a medicine *Thesium* is used to treat 137 ailments, predominantly reproductive and breast (22) and respiratory tract (18) ailments. The pharmacological activities of only two species have been studied and include analgesic, anti-inflammatory, anti-oxidation and anti-bacterial activity. Chemical analyses are available for only eight species, with flavonoids, fatty acids and alkaloids as the main compounds. While ample information is available on the traditional uses of the richly diverse African *Thesium* species, the few Asian species dominate the literature on contemporary uses and pharmacology. Further research is thus needed into African species and their uses, including potential commercial uses. In addition, the phytochemistry, pharmacology and toxicology of many ethnobotanically-relevant species require further exploration.

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Challenges for the conservation of the useful neotropical palm pindobaçu (*Attalea pindobassu* Bondar) in the face of climate change

Pindobaçu (*Attalea pindobassu* Bondar) is a native palm of Brazil's Caatinga biome. The species has significant socioeconomic relevance for traditional communities in the Chapada Diamantina, Northeast Brazil, who employ it for cosmetic, food, and handicraft purposes. We investigated the suitability of habitats of pindobaçu using Ecological Niche Modelling under current and future climate scenarios, SSP2-4.5 (optimistic) and SSP5-8.5 (pessimistic), to evaluate the effectiveness of the current network of protected areas (PAs) in long-term conservation of the species. The current distribution model predicted climate suitability of 68,754km, consisting of 8.04% of the Caatinga area. According to the models designed for SSP2-4.5 scenarios, the suitability areas are

being reduced over the years when compared to the current model: i) 2040 reduction of 23.94%; ii) 2060 reduction of 50.7%; iii) 2080 reduction of 64.73%; iv) 2100 reduction of 75.21%. For SSP5-8.5 scenarios, the generated models showed a more accentuated reduction in all evaluated periods: i) 2040 reduction of 37.27%; ii) 2060 reduction of 60.46%; iii) 2080 and 2100 reduction of 100%, indicating probable extinction of the species. A low percentage of climate suitability areas were observed within the PAs, in the current scenario and in the future scenarios. The creation of germplasm banks for ex situ conservation, creation and expansion of PAs, and monitoring of natural populations is crucial to ensure the sustainability of this palm's resources for traditional communities into the future.

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Leveraging phytochemicals: the plant phylogeny predicts sources of novel antibacterial compounds

The evolution and spread of antibiotic resistance have been the greatest threat to successful antibiotic treatment, and hence the driving force behind the search for new therapies. Ironically, none of our modern pharmaceutical antibiotics have been developed from plants, albeit plants have been used since antiquity in traditional medicine to fight bacterial infections. We phylogenetically analyzed 137 plant species with antibacterial activity and found 7 plant families (Combretaceae, Cupressaceae, Fabaceae, Lamiaceae, Lauraceae, Myrtaceae, and Zingiberaceae) that are disproportionately important, with confamilials possessing phytochemicals exerting similar antibacterial mechanisms, as expected due to common ancestry.

Phytochemicals produced were primarily involved in the disruption of the bacterial cell wall/membrane and inhibition of quorum sensing/biofilm production. The related families Combretaceae (white mangrove family) and Myrtaceae (guava family) were shown to inhibit quorum sensing, disrupting bacterial communication implicated in pathogenicity, due to their flavonoids. Cupressaceae (cypress family), though unrelated, also exhibited this antibacterial function. The unrelated families Fabaceae (bean family), Lamiaceae (mints), Lauraceae (laurel), and Zingiberaceae (ginger family) possessed phytochemicals, primarily essential oils, that affected bacterial cell membrane/cell wall integrity. Species in these various plant families may offer unique natural products that could be developed into new antibiotics. Our study reinforces the utility of the plant phylogeny in drug discovery.

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Investigating the impact of light on growth and tryptamine content of *Psilocybe cubensis* mushrooms

Psilocybin and its dephosphorylated counterpart, psilocin, are tryptamine secondary metabolites found in magic mushrooms, particularly of the *Psilocybe* genus. The use of mushrooms dates back to pre-Colombian Mesoamerican societies within spiritual and mystical rituals. Synthetic versions of the compounds are gaining popularity as potential therapeutics in treating various neurological disorders, with the emergence of clinical

evidence. Psilocybin has found application in the clinical setting in the treatment of cluster headaches, anxiety and depression. Given the increasing interest in the therapeutic application of psilocybin and psilocin, there is an increased demand for these compounds, as well as the need for basic scientific understanding of their expressions and biosynthesis within fungi. This study was designed to determine the growth condition which facilitates increased production of natural psilocybin and psilocin in the most popularly grown mushroom species in the tropics, *Psilocybe cubensis*. Mushroom fruiting bodies in this study were cultivated under conditions varying light exposure periods. Fruits were allowed to develop in complete 24 h dark, 12 h light/12 h dark or 24 h light conditions. Results from this study revealed that fruits harvested from the 24 h dark condition were both physically and chemically distinct. These fruits contained significantly higher psilocin content than those grown in light ($p < 0.0001$) or normal ($p < 0.0001$) conditions. They also showed longer stems contributing to a greater percentage of the overall weight of the mushrooms as well as their total psilocin and psilocybin content. This poster will highlight growing conditions for cultivating mushrooms with increased psilocybin and psilocin content.

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Blue Economies and Coastal Ecological Knowledge

Blue economy is an emerging paradigm that has created spaces of knowledge in which oceans and marine ecosystems are considered a new source of goods and services capable of fulfilling the capitalist promise of sustainable development. In such a view, these resources will maintain and improve the production of food, energy, transport, medicines, and raw materials. Armed with a critical lens coming from Social Oceanography, we argue that the growing attention to intervene oceanic and coastal ecosystems to expand the economic frontiers of capitalist economies poses additional pressures to the natural and social dimensions involved in marine and oceanic governance. The former is particularly true for indigenous, traditional and other subordinated coastal communities and their associated small-scale fisheries, who hold comparatively less agency than national and international actors. We use various empirical examples from Latin America to demonstrate that these communities are placed under asymmetrical power relationships, facing high levels of uncertainty in the context of the blue development initiative due to the risks associated to further privatization, enclosing of the commons, and the erosion of local knowledge systems in the face of neoliberal conservation schemes. We conclude that a deeper understanding of how marine ethnobiology and political ecology can work together towards detecting and mitigating the deleterious effects of instaurating an overarching blue economy scheme. Our final intention is to offer a first step to open and transparent discussions of what and how ocean and coastal governance could repel the blue economy paradigm for the benefit of local livelihoods.

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Examining abiotic and biotic factors influencing specimen black oaks (*Quercus kelloggii*) in northern California to reimplement traditional ecological knowledge and promote ecosystem resilience post-wildfire

California black oak, *Quercus kelloggii*, plays an important role in the lifeways of many Indigenous tribes throughout California. Native peoples tend black oaks using Traditional Ecological Knowledge (TEK) to encourage the development and proliferation of specimen oaks. These mature trees provide a disproportionate amount of ecosystem services when compared to smaller black oaks. Altered approaches to land management and the cessation of low intensity cultural burns places these specimen oaks at risk. This project is a collaboration between researchers and a Native Advisory Council to examine abiotic and biotic factors influencing *Quercus kelloggii* to reimplement traditional ecological knowledge and promote ecosystem resilience post-wildfire. Data were collected from 55 specimen black oaks in Sonoma County. Specifically, we classified specimen oak growth habitat by measuring specimen oak crown area and live crown ratio, the size and number of surrounding trees and amount of surface and ladder fuel loads. The preserve burned in both the Tubbs Fire in 2017 and the Kincade Fire in 2019, the latter of which occurred after the completion of the initial data collection. Following the Kincade Fire we measured scorch height and related our variables to fire severity. Forest densification was found to have a significant negative effect on both canopy area ($p=0.003$) and live crown ratio ($p=0.038$) of the specimen oaks. Densification did not affect surface and ladder fuel load accumulation since the Tubbs Fire in October 2017 ($p>0.05$). Neither surface and ladder fuels nor forest densification variables significantly affected scorch height on the specimen oaks ($p>0.05$).

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The papermaking syndrome: using functional traits to explain patterns in ethnobotany

Fibers—substances that are much longer than wide— have played outsized yet under-researched cultural roles for millennia. In nature, plants and animals synthesize fibers to serve structural, conductive, absorptive, and thermal functions; mankind has in turn co-opted these functions by processing fibers into products like rope, nets, paper, brushes, brooms, and textiles. With many kinds of fibers available, cultures soon tailored specific fiber sources for specific products, often resulting in centuries-old traditions of use. Although ethnobotanists have now documented thousands of fiber-yielding source-product relationships, no test has yet been conducted to explain their specificity in origin and in use—which, moreover, could be used predictively to support claimed relationships lacking material evidence. In this study, we use fiber functional trait analysis to test a key ethnobotanical conjecture —the plant use value hypothesis, which posits that plant usefulness is a function of multiple traits evaluated together on both plants with traditions of use in hand papermaking (paper plants) and plants lacking such traditions (non-paper plants). Using multivariate analyses, we show that paper plants have a fiber physiology distinct from non-paper plants, and that there is a clear “papermaking syndrome” that ancient artisans leveraged in deciding which plant species to harvest for making paper. Our work helps to uncover the rationale behind the choosiness of our ancestors in creating and tailoring plant-based products to meet human needs.

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Impact assessment in conservation and restoration projects through the use of ecosystem health indicator scoring system

Conservation and restoration initiatives are lacking in reporting approaches that engender themselves towards easy implementation, short-and long-term impact and cost-effectiveness. Composing an interdisciplinary perspective for reporting on and evaluating ecosystem health is expected to help close the gap from knowledge generation to management action. The objective of this research is to identify a new score-based methodology to assess ecosystem health through biodiversity, socio-economic and public awareness metrics. This will be done through a combination of an extensive literature review and the surveying of academics and conservation professionals. Six pillars of conservation impact have been identified as fauna and flora, biotic and abiotic factors, threat management, community involvement, public awareness, and ecosystem services. Several indicators will be developed for each pillar based on the results of the literature review and survey responses. The indicators will then be analysed to receive a low, medium or high score in relation to optimal conservation or restoration outcomes. The indicator scores will be added together to generate a pillar score and an overall ecosystem health score that is project-specific. As a result, we expect to find a general consensus among professionals and academics for indicator use in this methodology. We hope to see an increase in understanding of conservation and restoration challenges among the general public who have interacted with this new assessment methodology.

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Tailored vines and Taylor's Law: examining vine growth on Puerto Rican coffee farms

How to deal with weeds is one of the most persistent problems in agriculture, and one goal of agroecologists is to apply ecological principles in aiding farmers with such potential problems. The agricultural system examined here is the coffee sector of Puerto Rico, where vines are the most evident weed problem. We used Taylor's Law (TL) to understand the dynamics of vines on these coffee farms. TL states that there is a power law relationship between a population's size and its variance, and so we used TL in an attempt to understand the evident variability of vines on farms. To do this, over a period of 12 months from August 2018 to July 2019, vine coverage on 20 coffee plants in 26 different coffee farms was sampled. We found that not only are both the temporal and spatial forms of TL present on these coffee farms, but that the Lewontin-Cohen model of stochasticity (LC) was also at play within this study system. The LC model postulates that a population's exponential rate of increase varies at random, independently of both the population's size and time. The combination of Taylor's Law and the Lewontin-Cohen model combine to explain both the general power law relationship between mean and variance and the deviation from the expectation of 1.0 for the parameter of that relationship. With these results, we hope that simple ecological laws will be able to help with weed management in agricultural systems.

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The gap between knowledge and actual use: Combining ethnobotanical food inventory with dietary assessment in a rural tropical food system in West Sumatra, Indonesia

There have been numerous studies documenting knowledge of useful biodiversity. However, studies capturing both overall knowledge and actual use are scarce. In the case of food, there is a known paradox of local communities surrounded by high levels of food biodiversity yet suffering from malnutrition. Our study aimed to assess the gap between available and actually consumed biodiversity of food plants. The study combined ethnobotanical inventory with dietary assessments methods. Through a mixed-method approach, 200 women were interviewed individually and 68 participants took part in focus group discussions. In total, 131 food plant species were documented. The dietary assessment showed that women consumed 66 food plant species in the last 24 hours. This indicates that only 50% of the total food plants were utilized during the previous day. We found that food group Pulses had the highest utilization ratio, as 78% of available species were consumed. The largest gap was identified for Nuts and seeds, where only 17% of species were consumed. The dietary assessment found that most women did not reach the recommended dietary allowances of micronutrients. The study identified a large gap between the diversity of food plants and their actual consumption. Our learning is that despite the importance of knowledge and its documentation, the actual use matters most. For future studies, we recommend documenting the knowledge but also capturing the actual use. The identification of the gap between useful resources and their actual use could provide more valuable and specific information for the communities, programs and policies.

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Collectors looking for trees: Restricted access to trees in times of increased international demand for shea nuts

Increasing international demand for shea nuts (*Vitellaria paradoxa*) by international actors has led to changes regarding access to shea trees, from an open-access to a more restricted tenure. As a semi-domesticated tree growing in private as well as common lands in West Africa, it takes several decades for shea trees to produce fruits. At the community level, these external changes spark processes of exclusion and increased competition among shea nut collectors. While the access restrictions affect primarily women, who represent the majority of the collectors, their diverse socioeconomic status leads to differentiated impacts among them. Drawing from data collected through photovoice and a survey carried out in Burkina Faso and Ghana, the paper adopts an intersectional lens and explores how shea nut collectors are differently affected by processes of exclusion from access to shea trees. Respondents report decreased access to open-access land, and experience increased competition among collectors, which emphasizes the power dynamics at play within the community. Consequently, many respondents dedicated an increased amount of time to shea nut collection, without necessarily collecting more nuts. These dynamics exemplify the burden put on women in development projects whereby their productive workload is increased while their reproductive tasks remain unchanged. We therefore question the assumption often made by international actors that shea nut trading enables women

empowerment. This paper draws from feminist and political ecology, and aims at showing the articulations between structural changes, local communities, intersectionality and the various level of inequality embedded in these processes.

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A tale of three sages: A comparison between ethnomedicinally important southern African *Salvia* species

Salvia L. is the largest genus of the Lamiaceae and many of the ca. 800 species have been used in traditional medicine since Greek and Roman times to treat many ailments, including cardiovascular diseases, infections and inflammation. Southern Africa is home to 28 *Salvia* species, 14 of which are endemic. Three closely related species of blue-flowered sages occur in the Cape region of South Africa, namely *Salvia Africana* L., *S. chamelaeagnea* Berg. and *S. dentata* Aiton. All three are used in traditional medicine and are locally referred to as bloublomsalie (“blue-flowered sage”). Trichomes (hairs and glands) on the calyces are of diagnostic value to distinguish between the three species. *Salvia Africana* and *S. chamelaeagnea* have been well studied in terms of their ethnobotany, chemistry and pharmacology, but *S. dentata* is still poorly known from a scientific perspective. A summary of ethnobotanical data shows that *S. dentata* is mainly used to treat respiratory conditions such as influenza, colds and coughs which is comparable to the medicinal records of the other two blue-flowered species. The essential oil composition of *S. dentata* was investigated for the first time and found to differ in the high levels of 1,8-cineole and camphor. These two compounds were previously found to have a synergistic antimicrobial activity, which may explain the traditional use against respiratory tract infections.

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Breadfruit Festivals in the Caribbean – Heritage, Livelihoods and Community Development

Emerging from a history of rejection since its introduction to the Caribbean in 1793, breadfruit (*Artocarpus altilis*, Moraceae) is now a widely consumed food that enjoys the status of inclusion in some national dishes, and is often featured in private and public culinary events in some countries in the region. However, it remains an underutilised crop with most of the production going to waste. Several of the region’s food festivals celebrate cuisines based on traditional plant food sources, including breadfruit, in various annual events that encourage consumption both by new or familiar users of these food crops. Primarily through interviews among organisers, participants and attendees conducted at breadfruit festivals between 2006 and 2018, in St Vincent and the Grenadines, Jamaica, Montserrat and Trinidad and Tobago the potential of these events for promoting greater utilization and commercialization of this crop was examined. The results showed that breadfruit festivals have stimulated interest, provided a much needed stimulus for increased consumption through the wide range and innovativeness of the dishes presented and created opportunities for income-generation. Their potential contribution to sustainable livelihoods and community

development through innovative applications or through transmission of commercially valuable traditional knowledge is evident but requires more support to be fully explored.

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Past, present and future of a community next to the biggest mangrove dieback of The Gambia

The mangrove forests of The Gambia, the smallest non-island country of Africa, account for 2.1% of the mangrove cover in the whole continent. Mangroves provide multiple benefits to local communities, as studied by many researchers in previous years. But they have been suffering strong pressures in the country, due to a range of natural and anthropogenic processes and most of the rural population has been directly affected. The village of Sankandi is located in the Low River Region (LRR), one of the poorest regions of the country, and the locals have been feeling the effects of mangrove loss and degradation directly, since the Sahelian Drought of the 70's and human activities reduced the mangrove cover by 90% in the area. Responding to this, the Sankandi Youth Development Association started a Community-Based Conservation (CBC) project in 2014, with now more than 200 volunteers. Mangrove reforestation with *Rhizophora mangle* is one of their main actions, having planted half-a-million propagules, followed by bee-keeping with more than 30 volunteers and horticultural production. They have the overall goal of empowering and protecting the rural communities in the LRR, by cooperating to protect the environment and to create alternative sources of livelihoods. The objectives of our ongoing study are listening to the perceptions of the locals about the CBC (motivations, socio-ecological impact,...), the environmental change, and the ethnoecological knowledge of the area, considering that CBC projects can be a great tool towards a more sustainable society.

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An evaluation of insecticidal activities and phytochemical properties of selected members of the family Meliaceae used traditionally as insecticides in southern Africa

Plants are known to be rich sources of bioactive chemicals, and more than 2000 plant species are known to possess insecticidal properties. Hence, plant-derived botanicals have emerged as a promising alternative to chemical pesticides due to their non-persistence, high selectivity, and low mammalian toxicity. This study aimed to evaluate the insecticidal activities of nine selected plants belonging to the family Meliaceae against the fall armyworm and the diamondback moth and assess their chemical constituents. Feeding deterrence and topical application bioassays were used to test their insecticidal activities. GC-MS analysis was used to identify the secondary metabolites present in each plant. The feeding deterrence bioassay showed that *Cedrela odorata* and *Turraea dregeana* extracts displayed excellent antifeedant activity against the fall armyworm larvae with a deterrent coefficient of 115.85 and diamondback moth larvae with a deterrent coefficient of 112.25, respectively. The topical application bioassay showed that *Ekebergia capensis* and *Khaya anthotheca* extracts had the

highest larval mortality against the fall armyworm with an LD50 value of 0.14 mg/kg. *Melia azedarach* extracts showed the highest larval mortality against the diamondback moth with an LD50 value of 0.14 mg/kg. On the other hand, GC-MS analysis revealed the presence of two noteworthy compounds, phenols, and terpenes, in all nine selected Meliaceae species. These two groups are well-known to have insecticidal and anti-feedant properties. This study provides support for the recorded traditional uses of Meliaceae species as potential biocontrol agents against insect pests.

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Indigenous use and Ethnobotany of *Cannabis sativa* L. in Thailand

Cannabis (*Cannabis sativa* L.) has been utilized as a source of fibers, food, oil, medicine, and recreation all over the world. The Thai government supported the use of cannabis as an herbal medicine. The preliminary data from this herbal plant can be used to help govern policies. The goal of this research was to look at the indigenous use and ethnobotany of cannabis across the country. A qualitative study used an in-depth interview to collect data, carried out from August to November 2021. Purposive and snowball sampling strategies were used to choose the subject. The data was examined using the content analysis approach. This study found cannabis used in 4 different ways: 1) as a fiber source, especially in Hmong Hilltribe culture in the northern area, 2) a food ingredient, cannabis leaves used to publish in the first Thai's royal cookbook and used as the ingredient in the local southern food (spicy duck curry), 3) a recreational plant, cannabis inflorescence used to be economic plants of north-eastern people for soldier relaxation in the Vietnam war period, and 4) a traditional/folk medicinal plant, the southern academician published the 108 cannabis folk medical formula, and the use of royal Thai traditional medical formula from the early Rattanakosin period for healing patients in Bangkok nowadays, etc.. Cannabis is widely used in Thailand, with numerous classifications, comparable to any other country in the world. It should be researched further in terms of its pharmacological activity to increase the acceptance of medicinal herbs.

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An inventory and analysis of the medicinal plants of Mozambique

A comprehensive checklist and analysis of the medicinal plant species and their uses in Mozambique and comparisons with South Africa provided a more profound understanding of the broad concept of Traditional African Medicine as a healing culture and the need for a more informative classification system. This study aimed to record all medicinal plants reported in Mozambique in literature and answer three main questions. 1. How many medicinal plant species have been recorded for Mozambique? Of those, how many are indigenous to Mozambique, and how many are introduced or cultivated exotics? 2. What are the main medicinal uses in Mozambique, and which species are used for which ailments? 3. What are the similarities and differences between the medicinal floras of Mozambique and South Africa – are the same genera and species used for the same ailments, and is there evidence of cultural exchange? 4. Does the data provide new insights into Traditional African Medicine as one of the oldest

medicine systems in the world? A total of 722 medicinal plant taxa from 442 genera and 118 families was recorded for Mozambique; 578 are indigenous. Of the 722 medicinal plant species, 484 are also used medicinally in South Africa. The similarity between Mozambique and South Africa indicates the existence of a hitherto unnamed medicinal system of the southern and eastern African Bantu-speaking cultures that deserve detailed comparative studies.

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Ethnobotany of Medicinal Plants Commonly Used by Eegun People in Badagry Local Government Area of Lagos State, Nigeria

The objective of this study was to establish a regional profile of the indigenous knowledge system (IKS) for medicinal plants used in the treatment of various diseases in Badagry local community of Lagos State, Nigeria. An ethnobotanical survey was undertaken to collect information from herb sellers, traditional healers and other people from different walks of life that gave their consent in granting the interviews in the study area during March and October 2020. Sixty medicinal plant species that belong to 35 families were for the treatment of various diseases. The highest number of plants were mentioned for the treatment of infections followed by infertility and malaria while internal heat had the least number of plants mentioned. Leaves were the highest mentioned plant parts followed by fruits, bark and roots while using the whole plant was the least mentioned. *Allium sativum* had the highest value for relative frequency of citations while *Vateria indica* had the lowest frequency of citations. *Allium* had the highest number of diseases being used for. This was followed by *Carica papaya*, *Citrus medica*, *Aloe barbadensis*, *Jatropha gossypifolia*, *Morinda lucida*, *Mangifera indica*, *Persea americana* and *Eugenia aromatica*. Decoctions and infusions were the most popular modes of preparation while oral use was the most common method of administration. Topical administrations occur to a lesser extent. This study allows for identification and documentation of many high valued medicinal plant species, indicating high potential for economic development through sustainable collection of these medicinal plants.

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Ancient DNA recovered from sediment shows plant composition shifts with historical human demography

Southern California has been a hotspot for human habitation, from when humans first arrived in the Americas around 14,000 years ago, up until now. Despite this legacy of human presence, studies that would elucidate the historical composition of the organisms that cohabited this region with humans are scant. Recently shown to be more effective than pollen records, eDNA can be used as a tool to reconstruct thousands of years of plant and mammal presence records. We sequenced the mammal and plant DNA present in a lake sediment core from Lake Elsinore, spanning 35,000 years of natural history. We seek to identify common ethnobotanical families, like Rutaceae, Fagaceae, and Apiaceae, to characterize the landscape around the time of human arrival to understand some of the challenges that early inhabitants faced when fighting to survive in a new land. Using target capture sequencing, we anticipate

being able to identify some sequences to species, with these species potentially being extinct animals, like the American Camel. Additionally, we can look for marine DNA sequences that could suggest trade between desert and marine settlements. This project will not only propose a novel method of successfully sequencing DNA from warm-climate sediment cores, but will define the role of humans in California's history of environmental change.

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Combining local and academic knowledge to define and assess wild food plant sustainable foraging in Norway

Wild food plants' contribution to food security is well recognised. In Europe, the use of wild food plants is an emerging trend in high-end gastronomy associated with notions of sustainable living in addition to being a subsistence activity grounded on long-standing traditions. This is particularly true in Scandinavia where popularity is fueled by the New Nordic Food movement. Here, we co-designed a research project with the Norwegian Association for Mycology and Foraging to characterize and assess sustainable foraging in Norway. We conducted 19 face-to-face interviews with key stakeholders and produced an online questionnaire returned by 219 recreational and commercial foragers. We enquired about what species are harvested, by whom and how, where do foragers learn, and what are their perspectives on the sustainability of foraging. We observe that foraging fosters a strong connection with the natural environment. They base decisions on when and how much can be harvested on moral judgements considering location, plant, and plant part being harvested. Foragers pay attention to native plants' conservation status and local abundance, the plant individual's survival after foraging, and also aim to not spread invasive species. We have visualized their decision-making process as a flowchart that, combined with academically-produced data on ecological and social aspects of foraging, we use to assess sustainability of foraging in Norway. Finally, we propose ways to apply this co-created knowledge to support transmission of knowledge about low-impact practices and sustainability ethics in Norway and discuss how our approach can be used in other geographical contexts.

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High market demand changes Shea processing practices and causes knowledge transformation in West Africa

Commercial and development actors influence traditional ecological knowledge (TEK) practices among rural populations in the global south through complex mechanisms. This paper explores this rural transformation dynamic through the case of shea (*Vitellaria paradoxa*). For centuries, women have collected and processed shea nuts into dried kernels, and subsequently butter. Over the last decades, the international demand for kernels has increased as opposed to butter. The results of 1100 household surveys conducted in Ghana and Burkina Faso about women's current and past processing methods and end-use of shea products, reveal that 1) processing methods are being homogenized, and 2) women abandon the butter making process in favor of selling shea kernels. This trend is more visible in Ghana, where especially younger women follow processing methods promoted by big companies and development

institutions, in contrast to Burkina Faso, where there remains higher processing diversity, and butter production. Loss of diversity in processing methods may reduce the ability to adapt to external changes, such as market demands and climate change. The decrease in butter production is leading to matrilineal knowledge loss and has implications for the household economy, as women substitute shea butter for industrial, more expensive cooking oils and skincare creams. The study offers a critical analysis of how the dynamic and multidirectional nature of rural transformations and TEK influence resource users and the entire value chain.

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Mitigating the Impact of Admixtures in Thai Herbal Products

Medicinal plants and their products are extensively used within indigenous healthcare systems in Thailand and several other nations. The international trade of herbal products has a noteworthy impact on the worldwide economy, and the interest in herbal products is expanding in both developing and developed countries. There has been rapid growth in the medicinal plant product market. However, in herbal industries, substitution and admixture are typical issues wherein species of lower market value are admixed with those of a higher value. The adverse consequences of consuming adulterated drugs are invariably due to the presence of an unintended herb rather than the presence of an intended herb. It has also been argued that admixtures are intentional because of the lack of regulatory policies for product authentication. This study aims to clarify the extent of species admixtures reported in the Thai herbal market and discuss the potential reasons for such adulteration. In the broader context of species admixtures, we strongly propose the establishment of multiple herbal drug repositories that can be developed to facilitate the use of comparative identity tests by industry, traders and researchers to maintain authentic health product standards and to certify the authenticity of herbal products. The establishment of centralized testing (CT) could be a promising initiative in Thailand for the development of science and technology, and the herbal medicines produced as a result of CT could be dispensed as prescription drugs based on disease consideration instead of as health foods or nutraceuticals.

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Economic botany of Ethiopia: An illustrated review of ethnobotanical treasures

Plants are an important part of everyday life in Ethiopia and an essential component of ancient history as well as contemporary culture. This can be witnessed in humble roadside coffee stalls as well as sophisticated Ethiopian restaurants that have become fashionable all over the world. A richly illustrated review of the useful plants of Ethiopia is presented, grouped in the following categories: 1. Staple foods; 2. Pulses; 3. Vegetables; 4. Fruits; 5. Oilseeds; 6. Spices; 7. Culinary herbs; 8. Beverages, sugar and stimulants; 9. Aromatic plants; 10. Frankincense and myrrh; 11. Gums; 12. Toothbrush sticks; 13. Fumigants and cleaning agents; 14. Medicinal plants; 15. Timber and construction materials. This overview highlights the main useful plants of Ethiopia and the many interesting and often unique ways in which they are used in everyday life.

Ethiopia has remained poorly known despite it being one of the oldest and most interesting civilizations of the world. It is a country with fascinating cultural and biological diversity that in many ways are representative of the African continent. It is the birthplace of coffee, second only to petroleum as the most valuable natural product commodity in the world. Many plant species that are commonly used in Ethiopia are underutilized from a global perspective and represent valuable potential starting points for the development of new commercial crops and products. However, measures should be taken to ensure the equitable distribution of the benefits to be derived from the development of this tremendous botanical and cultural wealth.

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Ethnobotany of the pitahaya or dragon fruit (*Selenicereus*, *Hylocereeae*, *Cactaceae*) in El Salvador

The fruit of the pitahaya or dragon fruit (*Selenicereus* spp., Cactaceae) has enjoyed increasing success worldwide. However, it plays a minor role in most of its area of origin, Mesoamerica. This study explores preferences and uses of the plant in El Salvador. It documents the selection criteria, traditional classification, and consumption preferences based on 150 interviews. The interviews were conducted in 11 of the 14 departments of the country, with both urban and rural people, of different educational backgrounds and livelihoods. Populations were documented, and fruit size, shape and sugar content was measured in a sample. The primary use of the plant was for food, as fresh fruit, and in (fresh) mixed beverages. One-third of the informants reported use in traditional medicine, more commonly in the western part of the country. Ornamental use was uncommon. The empirical classification was very local; it differentiated mainly by the origin of the plant (wild or cultivated), the flavor and color of the pulp. Sweet and red-pulped fruit were preferred and selected for, both for consumption and cultivation in home gardens; one home garden plant of wild origin had very sweet fruit. However, the varieties cultivated commercially were not very sweet and may not conform to consumer preferences. Statistical analyses showed a regional differentiation in the consumption and preference of fruits, which may be related to cultural and environmental traits.

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Biocultural diversity of sorghum in Tigray, northern Ethiopia

Sorghum is an important staple crop in Northwestern Ethiopia where farmers grow different farmer varieties and improved varieties in response to different ecological and socio-cultural context(s). In recent studies of sorghum genetic diversity in Ethiopia, little attention has been paid to ethnolinguistic factors. This study is focused on two sorghum growing ethnolinguistic groups of the Kunama and Tigrayan belonging to the Nilo-Saharan and Afro-Asiatic language families, respectively. The objective of the study is to understand the relationship between ethnolinguistic diversity and sorghum diversity in a cultural boundary. Ethnobotanical fieldwork involving sampling of sorghum varieties was carried out in the two ethnolinguistic groups. Morphological and genomic

characterization of 43 sorghum samples representing 14 farmer varieties and four improved varieties were conducted. We found that the two most widely grown varieties (*Dagnew* and *Wediaker*) among the Kunama community belong to the *Caudatum* botanical race, while the most widely grown varieties (*Chumurey* and *Mereway*) among the Tigrayan community are Durras, but Tigrayans in the same district as the Kunama are also cultivating *Caudatums* grown by their neighbors, while also cultivating Durras of their co-ethnics. The differences in the varieties grown are also attributed to the preferred traits and seed management practices between Kunama and Tigrayan. The population structure of the sorghum varieties included in this study corroborates the morphological pattern. This genetic diversity pattern tallies well with the oral and written history of sorghum cultivation by the two groups and reflects deep associations between sorghum genetic diversity and human cultures.

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Combining Indigenous knowledge and population genomics methods to understand the diversity and distribution of a staple food source used throughout the Western desert of Australia

One third of the vast island continent of Australia is classified as desert. These regions, though rainfall is low, are rich in flora and fauna. Research within the Western Desert has shown how humans and desert ecosystems have coevolved for ~5,000 years. This relationship was severely impacted by the forceful removal of Aboriginal peoples from their homelands for most of the 20th century. During this time, Australia's desert ecosystems went through drastic changes, e.g., frequency of fires, which led to decreases in taxa. As Aboriginal peoples are returning home to mixed-based economy lifestyles, their practices of hunting and foraging are aiding in the increase of taxa and facilitating ecosystem recovery. The Martu, Indigenous foragers of the Western Desert, use several *Solanum* L. species as food staples. *S. diversiflorum* F. Muell., known as wamula, has an edible, tasty fruit eaten when moving throughout the landscape. Seeds are discarded along movement corridors or in processing sites. Samples from two types of sites were collected: specimens from movement corridors within Martu title lands and specimens from assumed to be wild populations outside of the Martu territory. Population genomics methods are being used to assess the genetic diversity and population structure of disturbed vs. wild populations. In collaboration with the Martu, assessments are also being made to understand how they have shaped *S. diversiflorum* / *wamula's* distribution, diversity patterns, and dispersal. We are elucidating the role humans, being one of the best long distance dispersal agents, have on gene flow and plant distributions across Australia's Western desert.

Thank you for joining us in Jamaica at #SEBISE2022



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