

2019

Journal of
**MEDICINAL PLANT
CONSERVATION**

A United Plant Savers Publication



*What Is Going on
with White Sage?*

*Botanical Traditions
and Innovations in Bulgaria*

Plant Blindness

*Romancing the Root:
The Passions and
Perils of Wild
American Ginseng*

*Noxious and
Invasive Weeds
as Medicine*

*Conservation and
Sustainable Use of
Medicinal Flora In India*

*Paradise Found,
Traditional Healing Lost*

Celebrating
25
YEARS
1994-2019

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2019

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VOICES FROM THE LAND

by Susan Leopold

This year's Journal celebrates 25 years of Medicinal Plant Conservation and is our most extensive publication to date. The theme is Voices from the Land, with intent to share indigenous perspectives in relationship with plants. This perspective is most profound in the article on white sage and the conflict with commercialization and cultural appropriation of a plant sacred to many. These issues have been a part of United Plant Savers discourse since the inception of the organization. I looked back over all the past publications and discovered an article from 2005 by Karyn Sanders, "Wildcrafting: Why We Should Not, A Native American Perspective", who put forth a call for herbalists to consider not harvesting wild plants for seven years. Her article presents plants as people, living beings with capacity for knowledge, intimacy, relationships, and communication. This perspective aligns with another article by Dr. Jody E. Noé, MS, ND, from 2010, NO -DA -TSI A- DI -TA -S -DI "Tea That Makes Friends out of Enemies", Spicebush, *Lindera benzoin*." It shares the Cherokee traditional use of making peace with ourselves, with others, and with our environment. Certainly plants are teachers, offering wisdom and healing, as our ancient ancestors here long before us. Over the years we have had wonderful contributions such as Kat Anderson's, "The Original Medicinal Plant Gatherers and Conservationists", published in 2016, and in 2013 we published "DOING IT RIGHT, Issues and Practices of Sustainable Harvesting of Non-Timber Forest Products Relating to First Peoples in British Columbia" by Nancy J. Turner. All of our Journals are online free for download under the resources tab, and we look to publish our Journals into one book to offer a reflection of voices and stories over the last 25 years of the organization's diverse contributors.

We have filled this issue with international perspectives on how medicinal plants are managed, such as the innovations in Bulgaria and the impact of communism in regards to the medicinal plant trade in Albania. Stories from the Sacred Seeds international network of botanical sanctuaries share how India is trying to manage and protect its medicinal plant diversity and the work of Holt Woods in England, a medicinal forest garden teaching and networking farmers and herbalists. In a rapidly changing environment we have a story from the Marshall Islands dealing with climate change, the opportunity of using invasive plants as medicine; and "For the Wild," a project to restore the Redwoods; and a podcast, described as, "a love song to disappearing wild places." "Romancing the Root" is an article that reveals how ginseng works its magic bringing together important people\plant relationships to explore plant conservation and herbal medicine.

Our Journal is truly unique in the diverse and eclectic voices from our members. Stories from our Botanical Sanctuary Network and featured artists from our Deep Ecology Art Fellowship bring creativity to how we can enrich our relationship with plants and in return heal ourselves and the planet. We hope our Journal inspires, uplifts, and engages those who read its pages. Our members are critical to the work of United Plant Savers, and we thank you as we celebrate 25 years with the Opening of the Center for Medicinal Plant Conservation.

"In Native American culture we see ourselves as part of nature, intertwined with life, not separate. We as humans are connected to everything on this earth and in the universe. Every living being is our relation. Every action we take affects another. As Native people, we feel our purpose here is to protect Mother Earth, to tend this place we call home and help all living beings.

— Journal 2005, Karyn Sanders



WHAT IS GOING ON WITH WHITE SAGE?

by Susan Leopold

This year it was evident due to the social media reaction that people were expressing anger and concern over the increase in commercialization of white sage (*Salvia apiana*) and the cultural appropriation and offensive marketing that overlooks ethics and ecological, cultural awareness of a deeply sacred and spiritual plant.

The rumblings on social media in regards to those who claimed to wildcraft white sage, along with selling the wildcrafted material that was being gathered from public lands, were clues that the balance between respectful wildcrafting and the use of terms like “ethical wildcrafting and sustainable wildcrafting” for personal use versus commercial gain was being pushed to its limit.

In October of 2018, “Cleaning Space Kits” including white sage bundles appeared on the shelves of Anthropologie, and with the collective social media outcry they were removed from the stores almost immediately—thank you, Anthropologie. At this time white sage can be purchased on Amazon and Walmart websites and on the shelves of stores such as Urban Outfitters in pre-packaged new aged kits. This is a serious indicator of alarm for many who know and respect the ecological and cultural fragility of this plant.

One of the most active voices in the social media outcry is @Metzil on Instagram. The Metzil Project is an Indigenous based arts and culture collaborative, based in Los Angeles. The Metzil Project brilliantly updated the Wikipedia page on white sage to provide information on the recent controversy, citing the illegal harvest arrests and current press on this issue over the last two years.

Commercial harvest of wild white sage populations is a concern held by many Native American groups, herbalists, and conservationists. In June 2018, four people were arrested for the illegal harvest of 400 pounds of white sage in North Etiwanda Preserve in California.

It is very difficult when companies make claims of sustainable harvest when we have no accountability within a very secretive trade. In some cases permits are given on public lands for commercial harvest of economically valued plants, but in the case of white sage no such permit exists. The only way this would be legal is if harvesting took place on private land with permission. What I learned when I was in California and visited the Etiwanda Preserve was that it is the epicenter of the current commercial harvest. The rangers that I spoke with described a very difficult situation in that it is mostly

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ON THE COVER:
White Sage
by Rose Ramirez

Photo originally published in *Kumeyaay Ethnobotany: Shared Heritage of the Californias* by Michael Wilken-Robertson.



North Etiwanda Preserve, California

undocumented individuals that are desperate for the work, putting themselves in danger, sneaking into the Etiwanda Preserve to harvest. The residents living near the preserve, working with law enforcement to help coordinate efforts to address the issue were responsible for the recent arrest in June of 2018. This came about when four undocumented individuals were arrested with over 400 pounds of white sage harvested from the preserve.

The North Etiwanda Preserve is a unique Riversidean Alluvial Fan Sage Scrub plant community that provides protection for a number of sensitive plant and wildlife species, several of which are Federal or State listed threatened or endangered. Listed endangered species that may occur on the Preserve include the least Bell's vireo, California gnatcatcher, the southwestern willow flycatcher, and San Bernardino Merriam's kangaroo rat. Sensitive species include Los Angeles pocket mouse, San Diego black-tailed jackrabbit, American badger, coastal cactus wren, San Diego horned lizard, coastal western whiptail, Southern sagebrush lizard, San Bernardino ring-necked snake, coastal rosy boa, Coast patch-nosed snake, mountain yellow-legged frog, two-striped garter snake, Parry's spineflower, and Plummer's mariposa lily.

The Management Plan for the preserve acknowledges that the area is considered to be a sacred site by the Gabrielino-Shoshoni Nation and Serrano people and is currently being used for cultural purposes. It further states in the management plan their priority actions of conducting historical research, coordinating with tribes to facilitate access for ceremonies, and collection of white sage. When I spoke to a preserve manager, she confirmed the Preserve's efforts to provide permits to tribal members for collection of sage for ceremonial use.

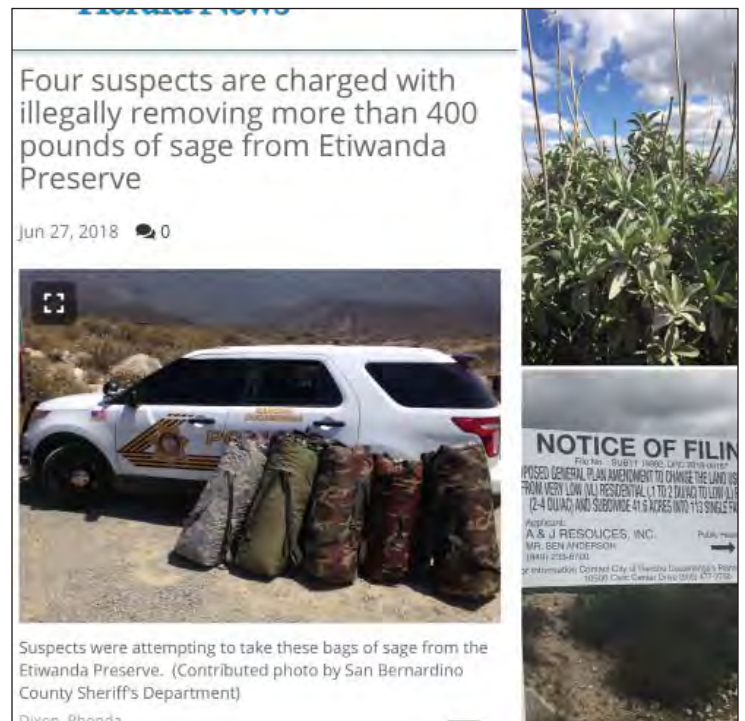
The San Bernardino associated governments along with multiple state agencies, federal/USFWS, local universities, and non-profits manage the preserve, which was first established in 1998 and expanded with highway mitigation funds in 2009. Working together the management plan establishes its principle goals.

Management Plan principal goals:

1. Preservation of Native Species, Habitats, and Ecosystem Processes;
2. Protection and preservation of Cultural Resources;
3. Monitoring Existing Habitats, Species, and Physical Conditions;
4. Restoration of Disturbed On-Site Habitats;
5. Develop and Maintain an Informational Database

What is important to stress is that this underground sage mafia is not ethical or sustainable wildcrafting as it is portrayed in hipster IG accounts and stores! The scale of white sage commercial trade on the Internet and demand in China is alarming.

United Plant Savers is working with agents at the USFWS and at the State level to provide as much insight as possible into the trade so that law enforcement can be informed to protect the preserve. I was invited by the owner of a white sage company to meet at the Etiwanda Preserve in March of 2019; he wanted to show his sustainable harvesting methods. I quickly pulled out my phone to show him that it was against the law to do so, and that recent arrests had been made. He carried on as if that were not the case, and fortunately law enforcement arrived, and I was able to get confirmation of the laws in regards to the preserve from the officer on the spot. His story quickly changed, and he claimed he no longer wildharvested but had a farm where he is now growing sage for his company. I tried to convey why



Above is just one example that came up in the search results for arrests related to illegal harvesting of white sage

the preserve did not allow commercial harvest permits and the level of community engagement that goes into ensuring safe haven for threatened and endangered species. Certainly he was proud to show off his harvesting technique and make claims to be a former student of Michael Moore, but he lacked ecological knowledge of the diversity of species in the habitat he claimed to sustainably harvest, not to mention basic laws surrounding wild harvest of plants on state and federal lands.

It can be frustrating when attempts to inform stores who sell sage bundles respond that they are getting their sage from those that claim sustainable harvesting techniques and have all the right verbiage on their social media and websites. Consumers and retailers need to understand laws in regards to wild plants because even if one's techniques are sustainable, if it is not permitted, then it is illegal. A first step for a buyer or consumer is to ask to see a permit.

White sage is abundant in its local habitat as a keystone species of its plant community, but that habitat is under threat due to development and it is fragile, apparent by the many endangered and threatened species that rely on its habitat. Most important to note is that it can be grown, and if it is to be in any form of commercial trade and certainly on the scale it is now, the only sustainability claims should be that it is coming from a cultivated source, and a buyer should always visit the farm to verify the claim.

Traveling throughout California to understand the state of sage habitats and the cultural teachings of white sage, I came across the recently published book *Kumeyaay Ethnobotany* at the Anza Borrego Visitors Center. The photograph by Rose Ramirez caught my attention and through a Google search I was able to locate her and ask permission to use the image for the cover of this year's journal.

We then began a dialogue on the issues and concerns over its recent popularity and I asked if she would provide me a quote to share from the perspective of an indigenous elder. She responded by telling me about the quote above by Barbara Drake. I was glad to find her quote that speaks to why they discourage selling of spiritual plants on a commercial scale because one does not know if the person who is collecting them is doing so in a good way, with a good heart as very profound.

Wildharvesting can be detrimental to the plant and/or the species that relies on the plant, but often it is most harmful to those who are harvesting, when they are forced into doing so for very little because they are in a desperate situation.

This is why programs like fair wild are important because they address the fair treatment of those communities of harvesters and the plants, and this is important. If we the consumers want to be healed by the plants, then should we not want those who are harvesting to be treated fairly? Conversely harvesting wild plants when regulated and when harvesters are treated fairly can result in beneficial relationships, for both consumer and harvester, and the harvester and the plants, as well as for the plants and their habitat. It seemed serendipitous

that my year would be filled with two impactful sage encounters, when I learned about the wild sage native to Albania facing overharvesting in the wild due to unregulated trade and the herbal companies working towards a solution by transitioning to cultivated sage and support to small scale farmers. (See article in this issue on Albania).

The Ethnobotany Project is a collaboration among Rose Ramirez, Deborah Small, and the Malki Baliena Press, working together to document southern California and northern Baja California's Native people's contemporary uses of native plants. The primary goal is to create

a resource for Native people in this region to share and learn traditional knowledge about native plant uses and gathering practices. The project began in 2007. Two publications have resulted so far: a 2010 large-scale calendar and a book in 2015. The Malki Museum, founded in 1965 by Native Americans (Dr. Katherine Siva Saubel and Jane Penn) on an Indian reservation, is the oldest non-profit museum in California and has been the inspiration for several other museums. My journey to understand the complexity of white sage has led me on a learning journey to the many state and federal recognized tribes and the discovery of many diverse projects working hard to revive and celebrate cultural and ecological diversity. I would encourage those who are drawn to white sage to spend time researching the cultures that have tended its habitat and choose a smudge that you build a personal relationship with and question the idea of ethical wild crafting, considering the habitat, the harvester, the laws, the cultures, and the medicinal teachings. ■

“We do not sell white sage. If you need it as a medicine and we have it, we’re going to give it to you. We discourage selling medicine plants, spiritual plants, because we don’t know if the person collected them in a good way, with a good heart. But if you have white sage growing in your own back yard, you would know because you would be taking care of it.”

– Barbara Drake, Tongva Elder



Tohono O'odham tribal elder Lois Liston uses a saguaro rib to harvest the cactus fruit at Colossal Cave Mountain Park. It is an ancient tradition practiced by the tribe. Photographer: Mike Christy

RECONNECTING TRADITIONAL HARVESTING PRACTICES WITHIN THE NATIONAL PARKS

by Susan Leopold, PhD

In 2016, the National Park Service enacted a ruling that allows the gathering of certain plants or plant parts by federally recognized Indian Tribes for traditional purposes. This landmark document established a protocol where tribes can formally request a permit to harvest, and then the NPS conducts an environmental assessment to review the impact of the request, and a contractual agreement is then established between the tribe and the park.

In some cases there are prior agreements, such as treaties that established the rights of local tribes to harvest certain plant materials, but these agreements are rare and this new ruling allows for future agreements that can build upon tribal relationships with National Parks. Reconnecting relationships between plants and people on National Park land has the potential to increase cultural and ecological diversity. Certainly the process is not perfect and can be perceived as cumbersome but it is a step towards acknowledgment of the indigenous relationships with the land prior to the current management and ownership by the national park service.

Shortly after the ruling the Tohono O'odham Nation requested to continue harvesting saguaro fruit (*Carnegiea*

gigantea) and cholla buds (*Cylindropuntia acanthocarpa*) in alignment with their traditional practices. These activities have occurred for millennia within the Sonoran Desert, including on ancestral lands now managed by Saguaro National Park. The 2016 rule has created a new framework for authorizing tribal harvest of plant materials by directing NPS units to specify proposed activities within an agreement and analyze impacts from the activities on park resources through an Environmental Assessment (EA).

In an article in the local paper Scott Stonum, chief of science and resource management for the park, said, "Upon completion of the assessment, the director of the Park Service's Intermountain Region signed a finding that the gathering has no significant impact on Saguaro Park and therefore can go on. "We realize that the current engagement of the Tohono O'odham people with the lands of Saguaro National Park is an important part of their cultural heritage, and that's part of what the park is here to protect."

"Based on the way they harvest and the relative small quantity they harvest, we feel it's very compatible with the operation of the park," Stonum said, noting that harvests took place long before the park was established, originally as a national monument in 1933. Tohono O'odham officials welcomed the decision to permit continued harvesting. "The saguaro fruit harvest brings families together every year to celebrate our cultural

heritage,” said Edward Manuel, chairman of the Tohono O’odham Nation.

Another example is the recent request from the Eastern Band of Cherokee Indians (EBCI) to harvest sochan (*Rudbeckia laciniata*) in the Great Smoky National Park. An extensive Environmental Impact study was done according to NEPA standards. This report is available on the Parks website and provides a wealth of information on the species and research that looked at effects of harvest on the species. In reviewing the study it appears that it recommends in favor of an agreement to allow harvesting along with monitoring in place and a five-year revisit/renewal of the agreement.

Plant population mapping and monitoring studies that result in agreements between tribes and the National Park authorities signal a change in the mindset of park based conservation where people are no longer perceived as separate from nature but are actively engaged in meaningful reciprocal relationships. In reviewing the guidelines that frame this new ruling and the plant specific agreements, it is encouraging to see the relationship between plants and people not be quantified by a financial gain but by cultural and ecological values. ■

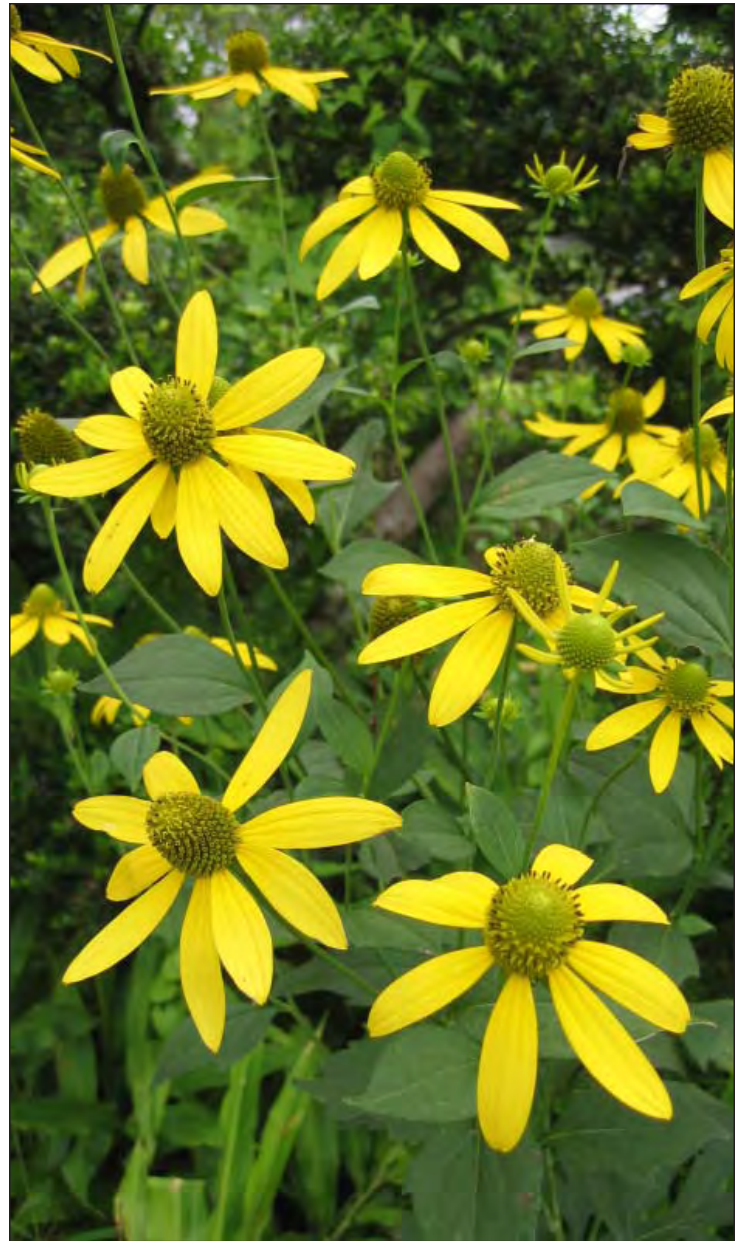
RESOURCES

Overview of the ruling and official announcement
<https://www.federalregister.gov/documents/2016/07/12/2016-16434/gathering-of-certain-plants-or-plant-parts-by-federally-recognized-indian-tribes-for-traditional>

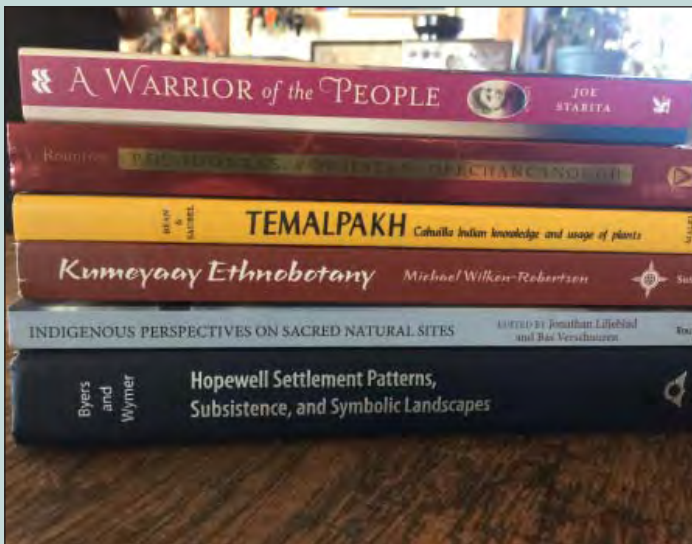
Information on Saguaro Fruit harvesting
<https://www.nps.gov/sagu/learn/historyculture/upload/Saguaro-Fruit-A-Traditional-Harvest-Brief.pdf>

Quoted article above
https://tucson.com/news/local/continued-harvesting-of-saguaro-fruit-in-national-park-by-tohono/article_d33942ba-05e7-5cdb-b721-c1fae1

EA study of sochan gathering
<https://theonefeather.com/wp-content/uploads/2018/11/GRSM-Sochan-Gathering-EA-20181107.pdf>



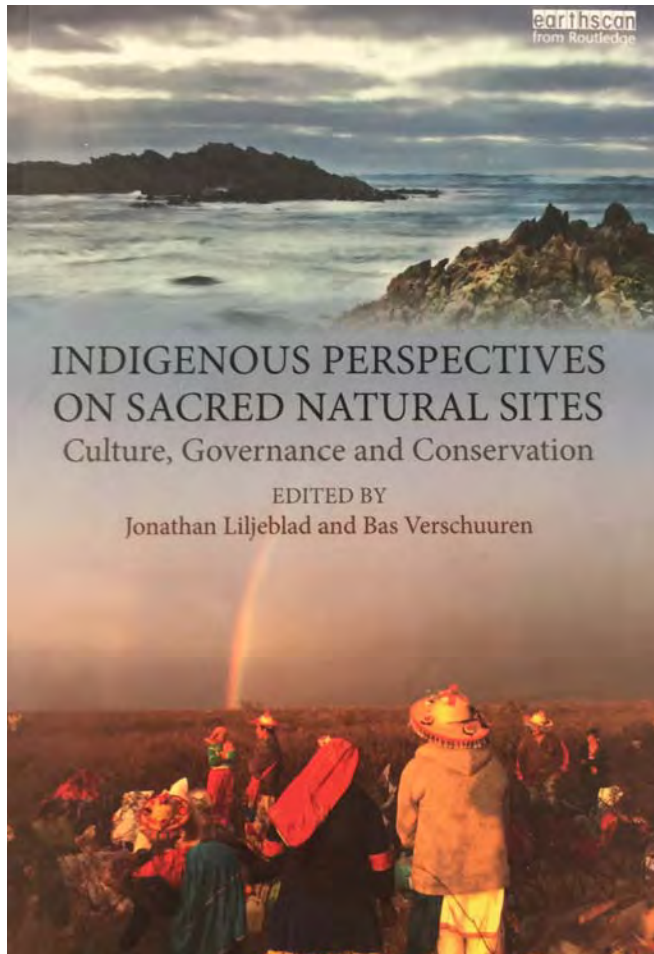
Cutleaf Coneflower (*Rudbeckia laciniata*) (Σ64 [CC BY-SA 3.0])



SUSAN'S STACK

Deep Dive Into Indigenous Knowledge

- *A Warrior of the People*, Joe Starita
- *Pocahontas, Powhatan, Opechancanough*, Helen C. Rountree
- *Temalpakh: Cahuilla Indian Knowledge and Usage of Plants*, Lowell John Bean and Katherine Siva Saubel
- *Kumeyaay Ethnobotany: Shared Heritage of the Californias*, Michael Wilken-Robertson
- *Indigenous Perspectives on Sacred Natural Sites*, Jonathan Liljebld and Bas Verschuuren
- *Hopewell Settlement Patterns, Subsistence, and Symbolic Landscapes*, A. Martin Byers and DeeAnne Wymer



Indigenous Perspectives on Sacred Natural Sites
Culture: Governance and Conservation
 Edited by Jonathan Liljeblad and Bas Verschuuren

Much previous literature on sacred natural sites has been written from a non-indigenous perspective. In contrast, this book facilitates a greater self-expression of indigenous perspectives regarding treatment of the sacred and its protection and governance in the face of threats from various forms of natural resource exploitation and development.

It provides indigenous custodians the opportunity to explain how they view and treat the sacred through a written account that is available to a global audience. It thus illuminates similarities and differences of both definitions, interpretations and governance approaches regarding sacred natural phenomena and their conservation. The volume presents an international range of case studies from Australia, Canada, United States, East Timor, Hawaii, India, Mexico, Myanmar, Nigeria, and the Philippines. A chapter contributed by Susan Leopold highlights the work of United Plant Savers.

After the Dragonflies

*Dragonflies were as common as sunlight
 hovering in their own days
 backward forward and sideways
 as though they were memory
 now there are grown-ups hurrying
 who never saw one
 and do not know what they
 are not seeing
 the veins in a dragonfly's wings
 were made of light
 the veins in the leaves knew them
 and the flowing rivers
 the dragonflies came out of the color of water
 knowing their own way
 when we appeared in their eyes
 we were strangers
 they took their light with them when they went
 there will be no one to remember us*

— W. S. Merwin

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BOTANICAL TRADITIONS AND INNOVATIONS IN BULGARIA

by Jennifer Gerrity



United Plant Savers' Susan Leopold and Mountain Rose Herbs' Jennifer Gerrity travel into the Balkan mountains at the peak of the autumn harvest to visit our organic farm and harvest partners in the Bulgarian countryside.

Amidst the stunning foliage of a golden autumn, I journeyed into the lush valleys and mountains of Bulgaria to seek out the wild plant collection sites where our regional partners harvest an array of our botanicals. Accompanying me on this trip was my esteemed colleague, ethnobotanist Dr. Susan

Leopold, Executive Director of United Plant Savers. We wanted to gain a deeper understanding of the horticulture of Bulgaria, meet the people who harvest these plants, observe their traditional methods firsthand, and learn about the culture surrounding plants in the Balkans.

When it comes to biodiversity, Bulgaria is one of the richest countries in Europe. It ranks third in the EU in the percentage of national territory that is included in the European ecological network Natura, a 28-nation nature preserve system founded to "ensure the long-term survival of Europe's most valuable and threatened species and habitats." The country has extensive laws governing the wild collection of indigenous plants regulated by the Medicinal Plant Act of 2000 and the Biodiversity Act of 2002, making Bulgaria a role model for the rest of Europe and possibly the world. It has a unique and strictly enforced system for ensuring the survival of its habitats, biodiversity, and endangered species.

Bulgaria's Ministry of the Environment and Water enforces these laws by annually auditing all companies who employ wild collectors or participate in the distribution of plant material domestically or for export. The country also has a list of non-pick plants (forbidden for commercial collection) and enforces collection limits for specially listed plants such as valerian, gentian, and elecampane. All wild collection of plant material in any season for commercial purposes undergoes a permit process that is audited in detail as part of an annual review.

We visited a consolidation site centrally located in the famous "Valley of the Roses," where wild *Rosa damascena* bushes grow alongside cultivars for as far as the eye can see. This facility is not only a distillery specially designed for creating rose absolute, but also a place where wild harvesters and farmers come with their bounty to have it weighed in and purchased. The consolidator showed us the extensive record keeping that goes into such an



Organic sunflower seed production for oils is one of Bulgaria's largest exports. The nation's strict regulations concerning environmental conservation and agriculture help maintain the clean air, water, and soil that support some of the lushest biodiversity in Eastern Europe.

КАК ДА СЪБИРАМЕ КАЧЕСТВЕНИ БИЛКИ КАТО ОПАЗИМ НАХОДИЩАТА ИМ?

Събирането в големи количества, с търговска цел, става само с Позволително.

Не замърсявайте находищата!

Пазете от пожар!

Лечебни растения събирани от дивата природа с търговска цел

Лечебни растения култивирани с търговска цел

The poster includes a grid of icons illustrating correct and incorrect collection practices. Below the icons, it lists medicinal plants categorized by whether they are harvested from the wild or cultivated. The plants listed include: Бръшляна, Черен брял, Върба, Мирабил, Липа, Обилна козина, Черен борвеник, and Шипка.

Educational posters depict proper wild collection practices as well as protected plants that must be left alone. Bulgaria strictly enforces its regulations governing the practice of wildharvesting, and field workers must be well trained in these rules to practice their craft for commercial purposes.



Gulka, an experienced wildcrafter, has been harvesting Bulgaria's wild bounty with her family for many generations. Wild collecting communities like Gulka's take great pride in their practice, and we're fortunate to benefit from their exceptional skills in locating, identifying, and properly collecting the precious plant treasures of their region.

operation. When bringing in a harvest, each collector must submit proof of permits and documentation comparing the weight of harvest as measured at the time of collection in comparison with sales invoices (to help monitor and manage overall harvest rates in a given season or area). The facility's walls were filled with educational posters from conservation organizations committed to promoting sustainable harvest practices in Bulgaria, each written in the local language and illustrated with easy-to-understand visual guides to proper collection practices. The instructive graphics allowed Susan and me to identify many of the wildharvesting best practices we work to promote back in the US—practicing careful plant identification before collecting, leaving plant roots in the ground when taking aerial portions, harvesting only in the proper season and when the species is an abundant population, and so forth.

While wildcrafting has held a prominent place in this region's traditions for centuries, participation in the trade has slowly but steadily fallen off in recent years due to factors like declining interest and a general population shift away from the agrarian villages into urban areas.

To help preserve these traditional practices, the producer we visited has begun hiring collectors as

full-time, long-term employees, offering them year-round work for competitive salaries and even providing bonuses in recognition of advanced knowledge and expertise. Such employment opportunities mark a significant shift in this industry, as collectors would have historically worked seasonally and independently for multiple outfits—and very much according to their own interests. For example, if a strong rainy season were to spur an abundant mushroom harvest, few collectors would hesitate to drop plant collecting in favor of these more lucrative pickings.

We traveled up into the mountains to the village of Zmeitzta at the peak of the juniper berry harvest, where we met Gulka, a seasoned collector who has been picking hawthorn fruits and juniper berries by hand for many years. Gulka and her family ascend these mountains during harvest season to gather fresh material and bring it down into the village to be placed in organic driers. She also harvests yarrow during the summer months until the season changes to juniper berry harvest. Juniper (*Juniperus communis*) season starts in September and ends with the first snow. Each year, the collectors comb the different regions for which the local municipality issues permits for wild collection according to its plant population conservation schedule.

A large distillery occupies the ground floor of the village's processing facility, where fresh botanical material is placed directly into the vats for distilling into essential oil. The facility had already worked its way through all the summer crops for the season, including yarrow, nettle, linden leaf and flower, elder flowers, and red clover blossoms. Now, processing of the late season harvests was in full swing—mainly juniper, but also some hawthorn berries, rosehips, and evergreens—during our visit, we witnessed white pine (*Pinus sylvestris*) boughs being brought in by the truckload.



From this somewhat mechanized but still largely traditional setting, we journeyed onward to a unique cultivation center that housed a state-of-the-art tissue culture propagation facility. Here, plant parts are cut, sterilized, and placed on an agar medium blended with natural growth hormones to encourage cell growth in a completely controlled settings (each type of plant culture requires different environmental conditions, so various rooms are managed to accommodate each species). From this precisely cultivated tissue, many plants can be propagated and then slowly transitioned into a greenhouse environment and eventually nursery rows, wherein they gain the hardiness to weather the elements when transplanted into the field. Ultimately, the established plants will be dispersed to the facility's large farmer network for commercial scale organic cultivation. This cultivation method provides several benefits, allowing growers to cultivate a surplus of plant material rapidly and at the same time ensuring species consistency across all the plants propagated.



Jars of tarragon (*Artemisia dracunculus*) are cultivated en masse through tissue culture propagation for eventual placement in the field. This innovative practice ensures the desired species identification, allows the propagation of many individuals at one time, and facilitates germination of difficult to grow plants.

We were also intrigued and inspired by this particular lab's experiments with woodland botanicals that are at-risk in the wild, such as goldenseal and black cohosh. While there is still much research to be done for these two species, the researchers are encouraged by their abundant success with other plants like lady's mantle, licorice, and tarragon, as well as species of raspberry and strawberry prized for their leaf production.

Additionally, the laboratory team has also instituted an outreach project at the high school serving its surrounding agricultural community, designing and financing a plant identification and conservation program to encourage student exploration of this unique regional trade.



Organic farms thrive in Bulgaria's fertile soils, where many tea crops such as comfrey leaf and root, chamomile, coltsfoot, catmint, tarragon, and lovage are commonly cultivated.

We left the facility and drove through the winding switchbacks of the Balkan mountains into southern Bulgaria, passing the occasional horse-drawn wooden cart along the way. The road offers vistas of rich farm lands patchworked with sunflower fields against a backdrop of rock cliffs. Small agrarian villages dot the roads, where homes made of hand-hewn wood and stone stand enshrouded by canopies of grape vines heavy with ripe clusters, just waiting for the villages' annual wine making.

We reach the lower lands and walk through the cultivation sites of many of our common botanicals, such as lemon balm, hyssop, marshmallow, tarragon, catnip, elder, and alfalfa. The fields are crossed by carved out furrows that distribute fresh water for irrigation. The hedgerows are thick with blackthorn, wild hemp, and wild hops growing together. A slight smoky scent wafts our way from some structures nearby, where sunflower hulls and peppermint stalks from the local farms are burned to fuel the driers for other crops. This corner of the world feels like it has supported agriculture since the beginning of time, yet our travels demonstrate how gracefully it has also adapted to the modern world's

changing and growing demands for aromatic and specialty plants—an inspiring and pristine example of sustained organic polyculture farming put into practice.

We are honored to partner with talented stewards who care so deeply for their unique natural environments, the biodiversity they support, and the incorporation of their traditions into a forward-thinking vision for their horticultural heritage. ■

Jennifer Gerrity is the Chief Operations Officer at Mountain Rose Herbs and has played a key role in establishing the company's botanical sourcing program over the last decade. She has a bachelor's degree in Plant Science from Rutgers University, where she specialized in propagation and agribusiness management. During her study there, she focused on tropical agriculture, bioremediation, and tissue culture and continued doing research for the university and the EPA after graduation. Jennifer oversees the staff, production, and quality assurance at Mountain Rose Herbs. She takes special interest in the procurement of high quality organic herbs, spices, and teas through domestic farm visits and international travel. She is committed to farm development and outreach in the form of special projects such as our Fair For Life partnership in Karnataka and cultivating a domestic market for woods grown American Ginseng.



SUSAN'S STACK

Ethnobotany Reading List for 2019

- ***The Joy of Forest Bathing: Reconnect with Wild Places & Rejuvenate Your Life***, Melanie Choukas-Bradley and van der Vorst
- ***The Gardens of Emily Dickinson***, Judith Farr
- ***Thus Spoke the Plant: A Remarkable Journey of Groundbreaking Scientific Discoveries and Personal Encounters with Plants***, Monica Gagliano
- ***Herb-A-Day***, James A. Duke
- ***American Eden: David Hosack, Botany, and Medicine in the Garden of the Early Republic***, Victoria Johnson
- ***Rory McEwen: The Colours of Reality***, Martyn Rix
- ***Herbarium***, Emily Dickinson



*Prevent Plant Blindness Logo digital design
From the Collection of The Lloyd Library and Museums
artists-in-residence project, Posters for the Plant Blind 2018*

PLANT BLINDNESS

by Anna Kell

Last June, we collaborated as artists-in-residence at the Lloyd Library, where we worked for the month on a design project titled Posters for the Plant Blind. Digitally collaged with visual elements culled from the library's extensive collection, the posters are meant to highlight the presence of plants in our world as well as ripe resources like the Lloyd Library.

"Plant Blindness" is a term, coined by educator-botanist James Wandersee and Elisabeth Schussler in 1998, that describes what they observed to be an increasing inability among 21st century people "to see or notice the plants in their environments." While early scholarship centered on explanations such as zoochauvinism, or the cultural preference for animals based on shared characteristics, Wandersee & Schussler steered the term's relationship to vision, shifting the focus onto the limitations of human perception and visual cognition, an area that artists have long investigated.

Since initiating the project, we have finished a number of posters and allowed the work to branch into new directions. The Pantry, one of the more elaborate of our designs, is a sprawling, illustrative map of thirty common kitchen items engulfed with a lush border of plants that reveals the source of each item's main ingredients. The poster lures viewers into its content through the use of familiar staples, like Grippo's chips and Kroger-brand black pepper, simultaneously making us aware of the plants and their indispensability. Our Eye Test poster is inspired by the original prevention campaign initiated by Wandersee & Schussler, whose poster featured a rather surreal and now-dated design of a blurry landscape overprinted with these three words: PREVENT PLANT BLINDNESS (and was distributed to over 22,000 school teachers). Our rendition serves to test and augment viewers' knowledge of regional, native trees,

while synthesizing our mutual interest in the dizzying spatial effects of 60s "Op" art, vintage optometry charts, and the many representations of leaves we found in the Lloyd's archive.

We hope our posters foster not just an aesthetic experience, but the start of an educational one, capable of improving plant literacy and cultivating a greater sense of connection with plants. Luckily, no matter what your work is in the world, Wandersee & Schussler articulate a simple and elegant piece of advice to help prevent future plant-blindness: pass on and share your knowledge of plants.

There are many ways to become what the pair dubbed a "plant mentor". If you know how to grow and tend plants, do it with the children in your life. If you can identify plants in your local landscape or distinguish their parts, teach those around you how to do the same. If you don't have children in your personal life, volunteer to do a workshop at a school or community garden (or guerilla artist-activist style, wherever and however you dare).

Culture is built through the passing down of information and experiences. Our muses remind us that without "conscious intention, attention, and effort to preserve it", the information our brains receive about plants is likely to be discarded; all that green, leafy stuff simply can't compete

with the plethora of extraneous cultural imagery for our attention. In 2019, and beyond if it goes well, let's do something—however we can—to make space for the awareness and appreciation of plants. ■

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- Wandersee & Schussler, "Toward a Theory of Plant Blindness," 6-7

Anna Kell is Assistant Professor of Art at Bucknell University in Pennsylvania.



thirty COMMON PLANTS of the pantry

01. <i>Allium sativum</i>	02. <i>Asiaticum</i>	03. <i>Asiaticum</i>	04. <i>Asiaticum</i>	05. <i>Asiaticum</i>	06. <i>Asiaticum</i>	07. <i>Asiaticum</i>	08. <i>Asiaticum</i>	09. <i>Asiaticum</i>	10. <i>Asiaticum</i>	11. <i>Asiaticum</i>	12. <i>Asiaticum</i>	13. <i>Asiaticum</i>	14. <i>Asiaticum</i>	15. <i>Asiaticum</i>	16. <i>Asiaticum</i>	17. <i>Asiaticum</i>	18. <i>Asiaticum</i>	19. <i>Asiaticum</i>	20. <i>Asiaticum</i>	21. <i>Asiaticum</i>	22. <i>Asiaticum</i>	23. <i>Asiaticum</i>	24. <i>Asiaticum</i>	25. <i>Asiaticum</i>	26. <i>Asiaticum</i>	27. <i>Asiaticum</i>	28. <i>Asiaticum</i>	29. <i>Asiaticum</i>	30. <i>Asiaticum</i>
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NOXIOUS AND INVASIVE WEEDS AS MEDICINE: AN ALTERNATIVE FOR THE PESTICIDE TREADMILL AND A WAY TO REDUCE USE OF AT-RISK MEDICINAL PLANTS

by Autumn Arvidson and Kelly Kindscher

Introduction:

The use of medicinal plants is gaining popularity in the health industry as more individuals are recognizing the risks associated with modern pharmaceuticals and the benefits of many herbal products. While this may be considered a step in the right direction for individuals seeking low side effect treatments, it is worrisome for those trying to manage populations and preserve the integrity of at risk native medicinal plants. Perhaps a way to reduce harvesting of at risk native plant species would be to find alternative medicinal plants which offer some of the same healing properties; we would like to recommend consideration of noxious and/or invasive plants. There is an abundance of non-native invasive and noxious weeds that have promising medicinal uses that could be used alternatively. This would not only allow for the harvesting of some native medicinal

plants to be reduced but would encourage an eco-friendlier way of managing populations of noxious and invasive weeds.

With the abundance of non-native weeds in the United States remaining constant or increasing and the increasing toxicity of the herbicides used to remove them, changing the negative relationship people have with weeds would have many positive impacts. There is significant research published showing numerous medicinally promising non-native plants present in the United States. These plants include kudzu (*Pueraria montana*), purple loosestrife (*Lythrum salicaria*), and creeping Charlie (*Glechoma hederacea*), all of which were introduced to North America intentionally for their ecological benefits, such as preventing soil erosion. For the purposes of this literature review, the plants listed above were focused on as examples due to the abundance of peer-reviewed research which determined the chemical components of the plants and their respective potential as medicinal tools.



Figure 1. Kudzu (*Pueraria montana*), trying to cover a house

Kudzu	Purple Loosestrife	Creeping Charlie
Location and Legal status: <ul style="list-style-type: none"> Found in Midwest and southeast US. Noxious in 10 states Invasive in 1 state Quarantined in 4 states 	Location and Legal Status: <ul style="list-style-type: none"> Found in most of North America Noxious in 19 states Invasive in 1 state Prohibited in 7 states 	Location and Legal Status: <ul style="list-style-type: none"> Found in all North America excluding; NM, AZ, NV. Noxious in CT <p><i>*While the plant is only noxious in one state, other states are considering reclassifying the plant due to its increasing presence.</i></p>
Useful Compounds: <ul style="list-style-type: none"> Antioxidants Isoflavonoid 6'-O-α-d-glucopyranosylpuerarin 3'-methoxypuerarin O-α-d-apiofranosylpuerarin Biochanin A Formononetin Daidzin Daidzein 	Useful Compounds: <i>Polyphenols:</i> <ul style="list-style-type: none"> C-glucosidic Ellagitannins C-glucosidic Flavonoids Heteropolysaccharides 	Useful Compounds: <ul style="list-style-type: none"> methyl isoferuloyl-7-(3,4-dihydroxyphenyl) lactate 1α,10β-epoxy-4-hydroxy-glechoma-5-en-olide 1β,10α-epoxy-4,8-dihydroxy-glechoma-5-en-olide 1β,10α;4α,5β-diepoxy-8-methoxy-
Medicinal Uses: <ul style="list-style-type: none"> Fever, influenza, dysentery, hypertension, hangovers, migraines, improving cerebral circulation, antidipsotropic, anti-drinking. High antioxidant activity Reduces occurrence of breast, uterine, and prostate cancers. Lessens risk of coronary heart disease. Reduces menopause symptoms 	Medicinal Uses: <ul style="list-style-type: none"> Astringent, antihemorrhagic, dysentery, diarrhea, intestinal inflammation, hematuria, leucorrhea, epistaxis, hemorrhoids, intestinal bleeding, vomiting, colic. Helps relieve symptoms of some digestive and inflammation disorders. Lowers blood pressure. 	Medicinal Uses: <ul style="list-style-type: none"> Asthma, bronchitis, colds, inflammation, allergies, arthritis, fibrosis, hyperlipidemia. Remedy for gall and bladder stones. Reduces fluid buildup on body cavities and tissues. Inhibits tumor promoting activity in cells. Elevates circulating insulin levels. Alleviated diabetes-induced hyperphagia.

Legal Status, Useful Compounds, and Medicinal Uses of three exemplary noxious weeds)



Purple Loosestrife (*Lythrum salicaria*) in wetland ecosystem

Discussion:

Kudzu, which is so predominant in the South and coined “the plant that ate the South,” is very hardy and can grow where almost nothing else will. The plant produces several useful compounds and shows promise of being a medicinally significant plant containing the isoflavones, daidzein and genistein. These isoflavones have been found to reduce the occurrence of breast, uterine, and prostate cancers; lessen the risk of coronary disease and heart disease; and reduce menopause symptoms (June, 2003). Another compound found in kudzu, puerarin, is effective at reducing symptoms and side effects of alcoholism, including over consumption, dependency, and withdrawal symptoms. One study found puerarin extracted from kudzu to be effective at reducing binge drinking in all participants in a study, even when consumed shortly before alcohol consumption began. This study demonstrated that kudzu would be a safe and effective adjunctive tool in the treatment of alcohol abuse and dependency (Penetar, 2015).

Purple loosestrife is a non-native plant that invades wetland habitats. Purple loosestrife has many medicinal properties, as the whole plant from root to flower contains useful medicinal chemical compounds, which can be used both externally and internally. It can be used in several forms including powdered, infusion, and liquid extract for health ailments such as diarrhea, dysentery, inflammation of intestines, nose bleeds, and severe menstrual cramps. The plant’s flowers and roots can be used for their

astringent, styptic, antibiotic, hypoglycemic, or vulnerary effects on burns, snake bites, and pain management (Šutovská, 2012). Due to the plant’s astringent properties the extract has been shown to be very effective at treating conditions such as eye inflammation, sinusitis, varicose veins, hemorrhoids, and ulcers (Piwowarski, Granica, & Kiss, 2015).

Creeping Charlie, which while only classified as noxious in Connecticut has begun to raise concern in other states as its presence is ever increasing. However, as a medicine this plant would be very useful as it has been found to contain several promising compounds, one of which being rosmarinic acid, as well as some of its analogues, which can be used in the treatment and prevention of inflammation related diseases such as allergies, arthritis, and fibrosis (Kim, et al, 2011). Creeping Charlie has also been found to contain significant concentrations of oleanolic and ursolic acids, which have been found to promote tumor inhibiting effects. In a study monitoring papilloma (tumor) bearing mice which were treated with a topical ointment containing both oleanolic and ursolic acids, researchers observed that the number of papillomas per mouse decreased significantly when compared to the control group of mice who received no topical treatment containing the two acids (Liu, 1995). Furthermore, a study investigating the medicinal potential of oleanolic and ursolic acids found that the intake of these compounds elevated the circulating insulin level and alleviated diabetes-induced hyperphagia; which is characterized by hyperglycemia, weight loss, and increased food intake (Wang, Hsu, Cheng-Chin & Yin, 2010).



Creeping Charlie (*Glechoma hederacea*) flowering

While these non-native plants may currently be considered nuisances and largely unwelcome in the ecosystems they inhabit, they may be an innovative tool that could be used in improving the health of citizens and reducing the harvesting of native medicinal plants. Improving the health and abundance of native medicinal plants may be one of many positive side effects that would result from the use of weeds as medicinal products. This would also help to reframe the ways in which people view plants that are considered invasive and/or noxious, which would only further propagate the shift from thinking certain plants are inherently bad to viewing these plants as unproductive in their current environment, but if utilized could be beneficial in advancing treatments for certain health conditions.

Conclusion:

Further consideration should be given to how non-native invasive and noxious plants are being controlled and/or removed from ecosystems using ecologically degrading herbicides. The chemicals used to remove these weeds include 2,4-D, Dicamba, Picloram, and other broad leaf herbicides. Unfortunately, the use of these potent and toxic herbicides can be considerably harmful to non-target organisms, including native plants and insects. It is also worth noting that these herbicides have only limited success.

The effectiveness of these chemical control methods should be considered and reevaluated. Since the Noxious Weed Act was enacted in 1974, we do not know of one noxious weed that has been successfully eradicated and removed from the list. This may show that the current methods of eradicating these plants have not been, and will likely not be, effective, and this may lead to even more toxic herbicides being used in the future. It is a perfect scheme to have perpetual herbicide use.

The continued use of toxic herbicides will only further and exaggerate ecological degradation already being caused to the ecosystems of some native medicinal plants by invasive and noxious weeds. The lack of data showing the long-term effects of herbicide use in ecosystem health and functionality should

be concerning. The prolonged use of herbicides on invasive and noxious weeds may cause irreversible damage to soil, water, and macroinvertebrates that are integral components to the health and success of ecosystems. However, harvesting these plants for further testing and medicinal product production would be a mutually beneficial solution to the current weed-pesticide paradigm while allowing some at-risk native medicinal plant populations the opportunity to improve both in abundance and health. But if even a portion of the acreage of noxious weeds could be harvested for beneficial herbal product use, this would be an important demonstration of an alternative paradigm.

So, we would like to propose the following: In clean environments (those that do not have a history of being sprayed), the funds that have been used by the state and county governments to buy pesticides and hiring staff to spray noxious weeds should as a pilot project, be replaced with hiring herbalists and wild-crafters to harvest and prepare medicine from these noxious weeds. The research funding for noxious weed research and State Extension program funding related to noxious weeds could also be altered to include funding that would promote the techniques of harvest and most effective and healthful use of many of these plants. The results would likely be equally effective, while managing these noxious weeds. In addition, there would be healthful benefits for the environment and for people alike, including providing jobs for herbalists (yes, a jobs program for herbalists). We believe that developing this approach could benefit the health of ecosystems, while also reducing the use of some at-risk medicinal plants. And we believe it is time for a paradigm shift. ■

Autumn Arvidson is a TRIO McNair Scholar and recent graduate. She is now working with Kelly Kindscher on his Native Medicinal Plant Research Program at the University of Kansas.

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ROMANCING THE ROOT: THE PASSIONS AND PERILS OF WILD AMERICAN GINSENG

by George Lindemann

Toward the end of April 2018, the Chinese Government imposed a tariff on imported wild American ginseng (*Panax quinquefolius*). This little known wild root has somehow gotten into the middle of a brewing American/Chinese trade war. I am not sure whether this new tariff is a good thing or a bad thing for ginseng or ginseng lovers. I do know that wild American ginseng grows on my East Tennessee farm.

Ten years ago, I purchased a tract of land on Tennessee's Cumberland Plateau. The property rests on an east-facing mountain top. The elevation begins at around 2500 feet and gently rolls its way down towards the Tennessee River. In the distance is the Great Smoky Mountains National Park. The land was once used for coal mining, but over the last 75 years or so has been managed for timber harvesting. Approximately one-third of the property has recently been logged, leaving a wasteland of broken tree tops, brush, and muddy logging trails. It was my intent to clear this land of debris and plant a combination of native and non-native grasses. These new fields would provide pasture for income-producing cattle, as well as habitat for local and migratory birds and animals. I feel strongly that a farm needs to be economically and environmentally sustainable. My cattle operation would make money and enhance wildlife habitat.

One-third of the property contains creeks, marshes, and other types of riparian (wet) areas. The Cumberland Plateau's waterways are one of the world's most diverse and endangered freshwater ecosystems. I have been determined to do everything I could to preserve and even enhance those aquatic treasures, while simultaneously providing clean water for my cattle.

The remaining third of the property consists of mature forests. These forests provide ample trails for hiking,

mountain biking, bird watching, and of course, foraging. For several years I explored the woods and considered what else I might do to create economic value from my forest. Timber harvesting as a business doesn't make sense in an area near significant population centers. Near population centers, land is worth more for development than the harvesting of trees. That is, the forest was worth more intact and growing than as raw material. But ever the business man, I knew there was untapped value in those woods.

Late September is usually an off-season on the farm. The hay has been cut, the calves weaned, and the herds have been moved to their fall fields. It's too cold to swim in the spring-fed pond and too dry to paddle the Cumberland Plateau's free flowing creeks. Even so, my four kids and

I had to evacuate Miami in mid-September 2016 as Hurricane Irma threatened to devastate South Florida. Schools, businesses, and government all shut down in anticipation of the mega-storm. We headed north to our farm. It was on that trip that we found treasure: wild American ginseng.

Ginseng: A Plant with a Colorful History

Ginseng was first discovered in the new world about 300 years ago by a Jesuit priest who was living near Montreal. Exports to Asia began shortly thereafter. Early settlers like Daniel Boone are reported to have traded in ginseng. One of America's first millionaires, John Jacob Astor, made part of his vast fortune by trading and exporting ginseng. References to ginseng are replete in early American history.

Who bought American ginseng as far back as

three hundred years ago? The Chinese did. Why? Because they believed that ingesting ginseng cured depression, diabetes, fatigue, inflammation, nausea, tumors, pulmonary problems, and ulcers. Older and well-formed roots were believed to have spiritual qualities which brought good luck. Traditional Asian medical practitioners believed that ginseng was also a powerful aphrodisiac and an erectile dysfunction medicine. Today, the Chinese believe as strongly in the power of ginseng root as they did several hundred years ago. Unfortunately, after thousands of years of exploitation, wild ginseng is virtually extinct in Asia.



American ginseng (*Panax quinquefolius*)

Demand for ginseng is so strong that farmers have taken notice and tried to replicate the wild root with a farm-grown, “cultivated” version of the plant. While cultivated ginseng is effective, wild ginseng is much more potent. Ginsenoside concentration in wild roots is exponentially higher than in farmed ginseng. But wild ginseng grows very slowly in specific forest habitats. As a result, wild American ginseng, like the plants in Asia, is becoming harder to find in North American forests.

The root grows in cool shady areas of deciduous hardwood forests. These forests stretch along the Appalachian Mountain Ridge from northern Georgia all the way to southern Quebec. Ginseng grows best at altitudes of 600 to 3500 feet. In the southern United States, roots grow in wild mountainous areas. As you go further north, roots can be found in more populated areas. Unfortunately, roots closer to population centers are more likely to have been discovered and removed.

There is agreement (at least among the scientists and users of ginseng products) that it is perhaps the most interesting plant on the planet. According to ecologist James B. McGraw, roots can live up to 25 years, with a few living to 50 years of age. I have spoken to knowledgeable ginseng folk who claim that roots can live as long as 100 years. When the root turns four years old, it is mature enough to produce red berries. In autumn, berries fall off the plant and eventually become new roots—unless of course they are eaten by deer, rodents, or bugs.

Ginseng roots don’t necessarily come into blossom every year. They often lie dormant, though there is scant information explaining why and when this happens. Folklore suggests that like groundhogs the root is able to “predict” the weather. Some people believe that roots stay dormant if they don’t like the “feel” of the upcoming growing season. Ginseng is steeped in lore, and because it is so hard to conduct long-term scientific research, it’s important to listen to and give some weight to folk tales and “digger” beliefs.

Poaching is a big problem, too. Plants under scientific observation in the wild are very often poached. Wild American ginseng’s monetary value is a welcome boon

for diggers, but the bane of ginseng scientists. Scientists report spending years researching specific patches of plants, only to return one fall to find their years of work stolen by an illegal digger. Diggers trespass on private land, they dig on public lands where they are not allowed, and they even dig outside of season and outside of prescribed age and size rules. But, poaching is not the only challenge faced by wild ginseng. Legal over-harvesting is a challenge as well. Ginseng is the most heavily traded wild plant in the United States. McGraw pointed out that in 1841, more than 600,000 pounds of ginseng root were shipped to Asia from the United States. According to Gary Kaufmann, a botanist



with the U.S. Forest Service, today, exports are about 10 percent of those totals. Eighty-five thousand pounds of legal ginseng are foraged each year. At the current rate of exploitation, the wild ginseng root’s sustainability prospects are not very good.

Root with an Uncertain Future

In 1975, the Convention on International Trade in Endangered Species of Wild Flora and Fauna (C.I.T.E.S.) was enacted. Rhino horn and ginseng (among others) were internationally protected by this treaty. The National Fish and Wildlife Service is responsible for reporting to, and complying with, C.I.T.E.S. in the United States. Even with international attention and protection, poaching is still rampant. It is easier to steal ginseng than to grow and harvest the plant. This

causes a vicious cycle. The rarer the roots are, the more valuable they become. The more valuable the roots are, the more they are pursued.

As North American populations have grown, ginseng populations have declined. Currently, Appalachian North Carolina, Tennessee, and Kentucky have become the root’s last stronghold in the United States. As land prices continue to rise with population growth, large swaths of ginseng habitat have been subdivided into smaller and more accessible plots. Once land is accessible, so is the ginseng.

Traditionally, over digging, conservation, and even poacher prevention was stewarded by local populations. McGraw states that “digging practices were passed from father to son and generally included respect for

resources." Absent sufficient science, local ginseng families are excellent information resources. These families know/knew that ginseng is a source of income, and they learned about and took care of their plants. They knew, without reading papers, about picking berries and planting them next to the parent root. They knew not to over dig. They knew to let the root grow to a ripe age and to leave a variety of aged roots in the ground.

Today, scientists are beginning to reevaluate regulations explicitly requiring that only older roots be harvested; these artificial rules are potentially changing the DNA of the root itself. Traditional digging families knew how to dig just the right number of roots and how to leave the right amount in the ground. They treated their ginseng forests as they did their crops—with rotations and fallow years. But times have changed. McGraw has estimated that currently in West Virginia, 4.9 percent of roots are harvested each year. This is not a sustainable yield. But, the "if I don't dig it, someone else will" challenge is a real threat to survival of the species.

Wild American ginseng, as its name suggests, cannot be grown on a farm. Its fate rests with conservation and management efforts. Regulations and policies are challenging to formulate and difficult to enforce. Some of the most intact ginseng habitat in the nation runs through Eastern Tennessee. The state of Tennessee is committed to conservation, yet it only employs one dedicated ginseng official. Despite her knowledge, passion, and commitment, she's just one person.

Even if the state were to allocate an entire division to ginseng conservation, a broader effort would still be needed. In order for any venture to succeed, the interests of all the stakeholders must be considered and accounted for. Government, landowners, nonprofits, diggers, and academics all need to find common ground. It's challenging to find common ground when so much (including the science) is unclear.

Many science-based organizations won't even address ginseng. Discussing and understanding the root is tainted with quackery. Some say that ginseng is for healers or poachers; it's not for the mainstream. Many

biologists don't consider the root or its impending extinction to be a serious problem. This needs to change if we are to save this piece of our heritage.

Federal and state governments need to address the concerns surrounding conservation efforts. Enforcement of old laws and the creation of new ones must be balanced with the cultural traditions of digging families. We have all sorts of rules and regulations for hunting rare animals. Similar attention and vigilance needs to be focused on ginseng. Scientific questions need answers as well.

For example, what is the best age to harvest ginseng plants? Should age determine harvestability? Or should the number of leaves (prongs) on a plant determine if it is ready to be dug? Should berries be left to fall on their own, picked and hand planted, or harvested to plant in other locations? Botanists, ecologists, and agronomists, among others, need to try and address these questions.

Education must also be part of ginseng conservation discussions. Unfortunately, ginseng is most often found in rural areas where efforts to educate and to license are often seen as too much government interference. Administering a government dealer/digger test would be, to say the least, highly problematic. Nevertheless, there are millions of acres of public land where ginseng has historically grown. Government must insert itself by working with nonprofits and research centers in order to survey and address the plant's needs.

Some states are beginning to make efforts to show local farmers how they might grow ginseng as a cash crop. Root care classes are offered to interested farmers. Berries or baby roots are provided or sold to class participants. These berry/roots are then planted in backyards or unused wooded areas. But wild American ginseng, as its name suggests, is a wild plant. Domestication efforts are complex. Nature has its own ways and when changed, bacteria, fungus, and disease often thwart "wild simulated" efforts. Plant health challenges combined with slow root-growth rate will likely deter many prospective farmers. Time is not on ginseng's side.



American ginseng berries

Can Commerce Save Ginseng?

Traditional farmers are not the only property owners who might be interested in ginseng. In rural Appalachia there are thousands of non-farming landowners with holdings from 10-10,000 acres of northeast facing habitat. Efforts to reach out and educate these folks could germinate a new conservation effort. Non-Timber Forest Products (NTFP) are a neglected revenue source for large tract landowners. If government or nonprofits connect landowners with traditional diggers, there is a potential for a win-win relationship. Landowners sign hunting leases. Why not sign a ginseng harvest lease? Diggers do not need government permits to forage on privately-held land. But they do need the owner's permission. The states can and should develop programs to bring these two ginseng stakeholders together. Most Appalachian communities have government or university agricultural outreach centers. These centers are fixtures in rural communities and are a good place to begin pairing diggers with a database of interested landowners. A well-defined lease will also encourage diggers to manage the ginseng population as if it were their own. Traditional diggers intuitively understand the plant and its complex needs. If long term leases are in place, more acreage will be properly managed and better protected from poachers.

The Cumberland Plateau is still a densely forested area. There are many private landowners who love their land and would be thrilled to learn about ginseng's possibilities as a NTFP. Profit is an excellent incentive. Until now, it has been the bane of ginseng's existence; the root is worth as much as \$1000 a pound. People will search and dig aggressively to make that kind of money. We must reach out to private landowners and educate them on the value of this plant, both to their wallets and to the planet. Many don't understand ginseng's importance as an indicator species nor its value as a NTFP. I was one of those landowners, but not anymore.

For years I walked and rode past vast forested areas wondering how I might create value beyond timber. I know the answer now. Harvested ginseng is worth a lot of money. It is also worth a lot to me if I leave it in the ground and conserve it for the sake of conservation. Who knows what the future might hold for such a unique and rare medicinal plant?

My fifteen-year-old son Sam is designing software to track the plants on our farm. It will use GPS tracking devices and insert locations, pictures, and information onto spreadsheets. We want to couple pictures and locations of plants as we find them. Just recently, Sam and I met with Dr. Ying Gao at Middle Tennessee State University. She is studying ginseng DNA and is very interested in seeing the new software. We are all hopeful that we can share the system with other growers. Dr. Gao has asked Sam to include space in the spreadsheets for various DNA results. The challenge is to share the data while maintaining location confidentiality. While most sensible growers would not want to share the exact longitude and latitude of his/her root with anyone else, they would likely share some information for the sake of science.

With the help of the new GPS tracking system, my family and I plan to map every plant we find. This will provide us with an inventory of our NTFP (our ginseng crop) and will also be a fun activity. There is ginseng all over Coal Creek Farm, and we are all determined to locate it, map it, and watch it grow.

Ginseng and More

Last fall I purchased three hundred roots (7-10 years old) from a local, trustworthy digger. We gently and lovingly replanted our new roots in a northeast facing slope on the farm. We're excited to see how many of those roots survive (so far most of them are growing quite well). In all of my research and meetings with state officials and scientists I have not encountered anyone else planting aged wild ginseng. But why not? I am curious to track the transplanted and natural roots. I will continue to explore the cultivation of ginseng and the value it may provide financially, medically, or maybe even spiritually. I also want to keep writing and talking about my experiences so that others might look in their backyards for their own treasure. Maybe it's ginseng, or maybe it's something else? When I wander through my woods, I still ask myself what other NTFP lie hidden in the depths of these Cumberland Plateau forests. Someone recently provided me material on yellow root (*Xanthorhiza simplicissima*). This plant has medical applications and is much more abundant than ginseng. But yellow root is not ginseng. Wild American ginseng is still the "king of herbs," and my ginseng journey is truly a royal romance. ■

George Lindemann is a father, philanthropist, farmer and more. He's a successful businessman, developer and devoted conservationist. He loves paddling and skiing and hiking. He's learned to appreciate the value of a great controlled burn and he's found Ginseng on his Cumberland Plateau farm in Tennessee. As a result of this discovery, he is now working with scholars to find better ways to manage and cultivate this endangered root. He's managing the farm with a combination of new technology and thinking, coupled with some of "the old ways." In the process, he's developing ways to feed his longhorns native grasses while encouraging the their recruitment. The native grasses bring back native flora and fauna that departed after years of clear cutting.

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Albania's mountains and valleys teem with rich botanical bounty. Mountain Rose Herbs and United Plant Savers visited its fecund countryside at the peak of the autumn harvest to meet the farmers and wildharvesters who help bring culinary apothecary herbs and fruits to plant lovers across the world (like the ripe and ready hawthorn berries above).

EXPLORING THE RESILIENT ROOTS OF ALBANIAN AGRICULTURE

by Jennifer Gerrity

Albania's mountains and valleys teem with rich botanical bounty. Mountain Rose Herbs and United Plant Savers visited its fecund countryside at the peak of the autumn harvest to meet the farmers and wildharvesters who help bring culinary apothecary herbs and fruits to plant lovers across the world (like the ripe and ready hawthorn berries above).

Having spent a number of gilded fall days traveling throughout the countryside visiting farms and villages in Bulgaria, Dr. Susan Leopold from nonprofit United Plant Savers and I journeyed west to connect with our growing partners in another Eastern European country filled with ecological treasures: Albania. Within Albania's biologically diverse mountain and valley ecosystems, hundreds of desirable native botanical species thrive in the wild. This incredible natural variety and abundance have set the scene for Albania's long-running and complex role on the stage of the global herbal trade.

We traveled south to picturesque Gramsh and high up into the southern Dineric Alps, which span the length of the country, taking in westward views into the fertile valleys sweeping towards the Adriatic and Ionian Seas. This dramatic landscape contains a variety of microclimates in which a diverse array of precious



United Plant Savers' Executive Director, Susan Leopold, pauses before a traditional farmstead along a country road used by locals to transport herb harvests down from the mountains to the area's consolidation sites. Most structures in these rural villages have been hand-built and rebuilt from resources found in the surrounding area, often maintained by the same families for generations.



A sweeping view from Shkembi i Kopacit (Kopaci Cliff) of the rugged, glacier-carved terrain of the Dinaric Alps, a region tended by Albania's farmers for hundreds of years. Throughout these pristine mountaintops grow some of the world's finest botanicals, raised on air and water of nearly unparalleled natural purity.

plants can grow with seasonal availability. An average of 260 sunny days per year provides the ideal climate for aromatic crops such as thyme, pennyroyal, and raspberry leaf, as well as high alpine natives such as arnica, valerian, and gentian. The terrain is unspoiled and rich, the air and water clear, and the people have homesteaded here in these rich lands for hundreds of years.

The small pockets of communities residing in these mountains have traditionally relied on wild botanicals for their economy and typically live very simple, agrarian lives. Up in these mountains, people have created beautifully constructed homes with stone and wood gathered from the very land on which these structures are built, and the plants and animals they rely on daily to survive are also housed or cultivated within a few minutes' walk of their front doors. We observe shepherds out roaming with their flocks, often stopping to collect desirable herbs along the way. We were lucky enough to run with a pack of true Anatolian shepherd dogs cruising the dramatic landscapes. It is a lifestyle from another era, where horses are the main mode of transportation, and goods are carried with hand-built carts.

And while we find it impossible not to lose ourselves in these tranquil and bucolic scenes, we are also aware of the decidedly non-idyllic historical events that led to a culture being effectively frozen in time.

Albania's long history of communism, which governed the country from 1941 to 1991, restricted free trade and occupation options, leaving many inhabitants of these

rural areas to rely on homesteading to survive. The long and oppressive reign in a way preserved this way of life, since living off the land up in the mountains became even more necessary as cities and towns were emptied of opportunities and resources.

During this difficult time in the country's history, the tradition of wild-harvesting was kept alive by collectors like Misir, who we meet upon our arrival in the village. Misir has lived in these mountains his whole life and comes from a group of wildcrafters who specialize in gathering rosehips and juniper berries in the autumn months. As he takes us into the mountains where he collects his berries for hours each day during collection season, he remarks that he could make more money doing other things, now that the political climate has improved, but that this is the way of life he prefers. For Misir, at least, catching up with the modern world seems a race not worth running, even when the government no longer prevents the people from doing so.

For others, the return of commerce to city centers has provided new economic opportunities, even for those who continue to live remotely and simply most of the time. In the center of this lush valley region, in an area still inaccessible by road, stands a completely hand-built village of the Romani people called Grabova. This self-sustaining community of 400 is completely self-governed. Our guide, Alban, is the buyer for these pickers. He explains that his father was once a prominent collector up in these mountains, so he grew up learning the trade, gathering berries, roots, and flowers. He eventually

learned the business side of things as well, and he now represents the collectors by consolidating and transporting their harvest to the city and negotiating for the best price.

The nation's plant bounty includes a wide range of apothecary and culinary favorites. Crafters of herbal remedies have long sought out its elderberries (*Sambucus nigra*), rosehips, hawthorn berries, juniper berries, and gentian. It also hosts many of Mediterranean cuisine's most essential ingredients, including thyme, mint, oregano, marjoram, savory, and tarragon—not to mention the famous wild Dalmatian sage, *Salvia officinalis*. This aromatic native was once abundant in the northern and the southern areas of the country along sea crests and rocky, low-elevation terrain. Its silver-green leaves are valued as a spicy culinary worldwide, and much of the supply comes from the rugged cliffs along the coast of the Adriatic Sea.

Albania is known for some of the world's finest sage, and due to the global demand on the small country, these populations have been dramatically over-harvested. Historically, collectors would seek out the herb just twice a year: once in the summer, and a second time in the fall. As demand increased, however, this harvest schedule was ramped up to four or five times per year, woefully depleting natural sage communities. In 2013, the Albanian government stepped in to stop the rampant picking, but this mainly served to drive the industry underground into a botanical black market that continued to threaten the future of this precious herb. Today, sage populations have somewhat recovered, allowing the government to instate a permit process for legally collecting limited amounts in select locations, but due to the challenges of verifying and enforcing these regulations, many commercial herb buyers have turned to cultivation on private land for a more reliable source of material. (In many ways, Albania's Dalmatian sage story runs parallel to the sourcing challenges associated with white sage {*Salvia apiana*} currently playing out here in the western United States.)

In fact, while at one time virtually all of Albania's commercial botanicals were wild collected, the entire industry is now undergoing a slow but apparently steady shift from wild-harvesting to dedicated botanical cultivation on farmland. This transition will likely become all the more pronounced (and necessary) as Albania brings more and more of its high quality botanicals into the global marketplace.

We visited Fran, a horsetail farmer in the northern region. His land is situated in a flat valley with dappled light and fed by natural geysers bubbling up from the earth. Silica-rich horsetail thrives abundantly in this pristine wetland, and Fran has stewarded this plot by keeping it open to the sunlight and free from weed species and roaming animals.

He cultivates two varieties, *Equisetum arvense* and *Equisetum fluviatile*, each in its own sectioned pasture. Fran hand-cuts the horsetail with a scythe and allows it to air dry naturally in a covered area protected from the sun.



Jennifer Gerrity admires the bounty from Fran's plots of horsetail (*Equisetum* spp.) and other commercial botanicals. This silica-loving herb thrives under the natural irrigation of the fresh spring geysers that gush up from the very ground in which Fran plants his crops.

While chatting and admiring this lush, green landscape, we are interrupted by a sudden spring bursting forth from the earth, and its crystal clear bubbles begin to flood the cultivation site. Fran knows well how fortunate he is to be able to harness these mineral springs for his irrigation. In this natural and self-sustaining system, Fran's fields are completely submerged with this pristine water from January into March. Fran also cultivates oregano, lemon balm, dandelion, marshmallow, and eucalyptus leaf, and he enjoys wild-collecting blackberry leaf, savory, wild thyme, and linden in the fields and forests around his farm.

As we approach the end of our travels here, we reflect on the intriguing and challenging contrasts we've observed along the way. While it would be naïve to deny the hardships suffered by these communities during past decades of oppression, the country has emerged with a landscape brimming not with the modern productivity of humans, but rather with the life-affirming productivity of nature. Those who guided us throughout our travels clearly love plants and the lives they have built around them, and many seem to be finding a comfortable rhythm between the still relatively new opportunities of reconnecting with world trade and honoring the traditional lifestyles that have long sustained them, or rather, have allowed them to sustain themselves. We look forward to returning again in the future, to see how this new/old world society continues to adapt, change, and grow—as natural things do so well. ■

"AT-RISK" & "TO-WATCH" LIST

STATEMENT OF PURPOSE

For the benefit of the plant communities, wild animals, harvesters, farmers, consumers, manufacturers, retailers, and practitioners, we offer this list of wild medicinal plants which we feel are currently most sensitive to the impact of human activities. Our intent is to assure the increasing abundance of the medicinal

plants which are presently in decline due to expanding popularity and shrinking habitat and range. UpS is not asking for a moratorium on the use of these herbs. Rather, we are initiating programs designed to preserve these important wild medicinal plants.

"At-Risk"

AMERICAN GINSENG

Panax quinquefolius

BLACK COHOSH

Actaea (Cimicifuga) racemosa

BLOODROOT

Sanguinaria canadensis

BLUE COHOSH

Caulophyllum thalictroides

ECHINACEA

Echinacea spp.

EYEBRIGHT, *Euphrasia* spp.

FALSE UNICORN ROOT

Chamaelirium luteum

GOLDENSEAL

Hydrastis canadensis

LADY'S SLIPPER ORCHID

Cypripedium spp.

LOMATIUM

Lomatium dissectum

OSHA

Ligusticum porteri, *L.* spp.

PEYOTE

Lophophora williamsii

SANDALWOOD

Santalum spp. (Hawaii only)

SLIPPERY ELM

Ulmus rubra

SUNDEW, *Drosera* spp.

TRILLIUM, BETH ROOT

Trillium spp.

TRUE UNICORN

Aletris farinosa

VENUS' FLY TRAP

Dionaea muscipula

VIRGINIA SNAKEROOT

Aristolochia serpentaria

WILD YAM

Dioscorea villosa, *D.* spp.

"To-Watch"

ARNICA

Arnica spp.

BUTTERFLY WEED

Asclepias tuberosa

CASCARA SAGRADA

Rhamnus purshiana

CHAPARRO

Castela emoryi

ELEPHANT TREE

Bursera microphylla

GENTIAN, *Gentiana* spp.

GOLDTHREAD, *Coptis* spp.

KAVA KAVA

Piper methysticum (Hawaii only)

LOBELIA, *Lobelia* spp.

MAIDENHAIR FERN

Adiantum pendatum

MAYAPPLE

Podophyllum peltatum

OREGON GRAPE

Mahonia spp.

PARTRIDGE BERRY

Mitchella repens

PINK ROOT

Spigelia marilandica

PIPSISSEWA

Chimaphila umbellata

RAMPS, *Allium tricoccum*

SPIKENARD

Aralia racemosa, *A. californica*

STONEROOT

Collinsonia canadensis

STREAM ORCHID

Epipactis gigantea

TURKEY CORN

Dicentra canadensis

WHITE SAGE, *Salvia apiana*

WILD INDIGO, *Baptisia tinctoria*

YERBA MANSA

Anemopsis californica

"In-Review"

HIGHEST PRIORITY: RESCORE NOW

SLIPPERY ELM

Ulmus rubra

GOLDENSEAL

Hydrastis canadensis

FALSE UNICORN

Chamaelirium luteum

BLACK COHOSH

Actaea racemosa

TOP PRIORITY: IN THE NEXT YEAR

SPIKENARD

Aralia racemosa, *A. californica*

CASCARA

Frangula purshiana

BLOODROOT

Sanguinaria canadensis

VIRGINIA SNAKEROOT

Aristolochia serpentaria

TRILLIUM, *Trillium* spp.

BLUE COHOSH

Caulophyllum thalictroides

WILD YAM, *Dioscorea villosa*

MID PRIORITY: IN THE NEXT 2 YEARS

LOMATIUM

Lomatium dissectum

OSHA

Ligusticum porteri

ECHINACEA

Echinacea spp.

BUTTERFLY WEED

Asclepias tuberosa

STONEROOT

Collinsonia canadensis

YERBA MANSA

Anemopsis californica

MAYAPPLE

Podophyllum peltatum

PARTRIDGE BERRY

Mitchella repens

Requested To Score

INDIAN PIPE

Monotropa uniflora

CHAGA

Inonotus obliquus

WILD CHERRY

Prunus serotina

SOLOMON'S SEAL

Polygonatum biflorum

YAUPON

Ilex vomitoria

WILD GERANIUM

Geranium maculatum

FOR THE WILD

By For the Wild Collective

In 2011, Ayana Young, then a Columbia University ecology student, was overwhelmed by climate chaos, mass extinction, and struggling to find a voice. That's when she got involved with Occupy Wall Street, seeing the protestors in Zuccotti Park taking action. "They put a vocabulary to what I was feeling," she says. "I was finally part of a community that was talking about the things that I was struggling with for so long."

This was Young's initiation into activism and advocacy work. Intentional and passionate, she turned with laser focus towards learning everything she should about deep ecology and the manifold threats that endanger the earth as we know it. The biggest detriment to our earth's health is human supremacy, which "isn't looked at nearly enough," says Young. "Why are humans somehow entitled to all the resources in the world?"

Young's organization, For the Wild is the result of her fierce advocacy. For The Wild is described as, "a love song to disappearing wild places," merging restoration and conservation efforts with storytelling and education. There are localized land-based projects, like the 1 Million Redwoods Project (<http://forthewild.world/1-million-redwoods-project/>), a boots on the ground, collective effort to renew and protect North America's Cascadia bioregion from Northern California to south-central Alaska, and there are also compelling media efforts, including the *For the Wild* podcast (<http://forthewild.world/listen/>), a weekly broadcast that has come to be known as a platform for critical discourse and coalition-building among people committed to social justice, wilderness conservation, and ecological renewal.

Young, who lives in Northern California, shares with clarity and urgency that now is a time to act to protect the landscapes, the plants, trees, and waterways that we love. She has felt a call to action from the forest, and her work is a response to defend the wilds of the Pacific Northwest.

Her 1 Million Redwoods Project is an initiative to renew and protect the biodiversity and resiliency of

the temperate rain forests in Cascadia through holistic research, biomimetic reforestation, land conservation, and nurturing living libraries of native seeds and fungi.

Young began her love affair with the temperate rain forest, as a commercial mushroom hunter, finding herself immersed in diverse forest expanses and witnessing firsthand the devastation wrought by human development, industrial logging, and resource extraction. Over 90 percent of native temperate rain forest has been lost, and what remains is managed heavily for timber production. Through forest immersion, the difference



For The Wild's 1 Million Redwood Project is dedicated to renewing and preserving the biodiversity and resiliency of Cascadia's temperate rainforest through holistic research, biomimetic reforestation, land conservation, and living libraries of native seed and fungi.

between the vitality of intact old-growth forests and the lifelessness of monocropped plantation forests became acutely clear. Searching for how best to support these ravaged ecosystems became a heart-song for Young. The idea for the 1 Million Redwoods Project was an inspiration that emerged through spending time listening deeply to the forest. Embodying a whole-systems approach to the 1 Million Redwoods Project, For The Wild is focused on planting a diversity of plant and mycelial species and bolstering reciprocal relationships between species. Recognizing that every ecosystem component, from soil microbe to canopy-dwelling epiphyte, is vital to the health and adaptability of a forest, and aiming to lean in to that.

Young and For The Wild are navigating how to engage in reforestation without following conventional methods that involve resource-intensive extractive practices like irrigation systems and plastic pots derived from fossil fuels, imported soil with ingredients extracted from far corners of the planet, like coconut core, peat moss, glacial rock, and perlite. Likewise, the contemporary model for reforestation of logged land

has primarily focused on a small number of profitable species, which are planted to become future timber. This is a factory-farm approach to tree-planting — a commodification of life, with short-term goals in mind. For The Wild is working a different approach entirely, asking instead how to support long-term thriving for trees to create biodiversity hot spots and to foster climate resiliency.

For The Wild is committed to a position in opposition to human supremacy and firm in their belief that nature



Ayana Young

should have the space and opportunity to evolve autonomously. Where they come in is to support and encourage native species to thrive as the climate grows more unpredictable. Influenced by Traditional Ecological Knowledge and learnings from experts in the field, including forest ecologists Peter Wohlleben, Suzanne Simard, and Sally Aitken and biomimicry pioneer Janine Benyus, For The Wild is employing a biomimetic approach and experimenting with direct seeding and coating seeds with a mixture of native fungal and bacterial inoculants to build soil integrity and encourage the plant to tap into the existing underground mycelial network.

This resource-sharing mycelial network is a primary focus of For The Wild's approach to resilient reforestation. Conventional methods, where trees are grown in pots in commercial nurseries for up to three years before being planted out, overlook the importance of the mycelial network. Forests are familial communities, supporting one another. When a tree is grown in isolation in a pot, its roots may have a more difficult time connecting when they are eventually planted. For The Wild isn't saying that growing in pots never has a place, but it is certainly a resource-intensive process, and arguably it produces less robust trees. Currently, most forests are replanted through commercial nurseries, but For The Wild is learning that biomimicry—the design of systems that are modeled on biological entities and processes—offers a new way of partnering with nature, and they aim to promote interconnectedness and harmony through their work.

Young is particularly concerned about how rising temperatures and decreasing precipitation will impact forests and specifically, the redwood range, which is quite narrow, uniquely cool, and moist, paralleling the thickest regions of the California fog belt. Redwood forests are reliant on coastal fog, which supplies up to 45 percent of the total water used by redwoods and two thirds of the water used by understory species annually. Implications for fog decline could be severe. Habitat ranges are shifting all over the planet. Slow-growing trees, like redwoods, will

have a particularly difficult time, as their southern range becomes uninhabitable.

It's abundantly clear that climate change is real, human-caused, and that we will all be directly affected by it. The wildfires in California are not an anomaly, nor are they restricted to the south. Forests are burning from Southern California all the way up to Alaska, and it's expected that fires will only escalate. Weather extremes, are quickly becoming the new normal. We can't deny extractivism, and capitalism play a role in what's happening, including climate change and the destruction of all forests.

The vast majority of redwood forest is degraded and earmarked for industrial logging, so these forest communities have been suffering extensively and by proxy, endangered species, such as the coho salmon, the steelhead trout, the marbled murrelet, and the northern spotted owl, along with whole ecosystems of plant species associated with redwoods, such as the coast fawn lily (*Erythronium elegans*), are becoming increasingly rare.

Climate change is not only hitting intact, healthy forests but also impacting vulnerable landscapes that have been logged, dammed, developed, mismanaged, and poisoned. The immune systems of these terrains have already experienced significant trauma. Human-centric interaction with the earth is contributing to a rapidly shifting climate in ways that can no longer be denied. Entire nonhuman communities are in deterioration, because all species are very much connected.

Young urges individuals to take action, reminding us, "Wherever you are, somebody is most likely already working to preserve biodiversity. Explore what Indigenous and grassroots groups have been doing in your area. Reach out and see how you can support them!"

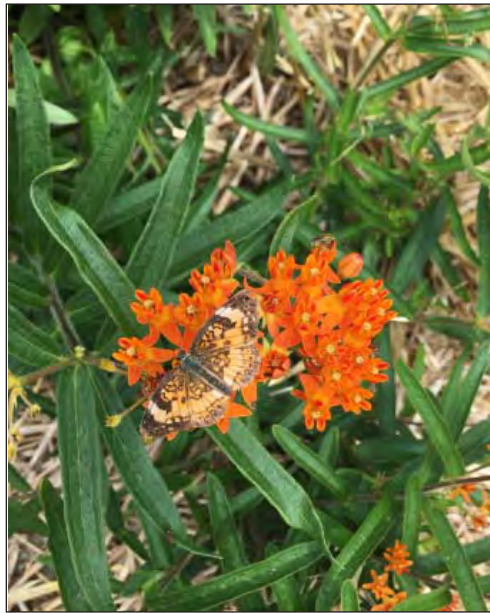
As the project continues to grow, For The Wild is looking to build a mycological and redwood research team to begin designing several experimental research projects, such as test plots and exploring assisted migration, as well as undertaking comprehensive scientific study. Keep in touch, through their newsletter (<http://forthewild.world/newsletter>), and stay tuned for announcements about land partnership opportunities, seed collection, and planting days.

If you are interested in supporting the 1 Million Redwoods Project, they're welcoming donations, calling in funds for seed collection and our seed library, scientific research, coordinating land partnerships, and the labor of love it takes to tend seeds and spores of biodiversity. For The Wild is looking to expand their network of land partners in Mendocino County. If you're looking to restore and conserve your land, or if you are excited about the collection and preservation of seeds and fungi, check out their website (<http://forthewild.world>) to find out how to get involved for future collaborations. ■

For The Wild is an anthology of the Anthropocene, focused on land-based protection, co-liberation, and intersectional storytelling rooted in a paradigm shift from human supremacy towards deep ecology.



Pink lady's slipper (*Cypripedium acaule*)



Butterfly weed (*Asclepias tuberosa*)



Bloodroot (*Sanguinaria canadensis*)

AT HOME WITH THE LAND

By Meaghan Thompson

During a recent dinner conversation with friends, the subject landed on the meaning of place and how one can have the feeling of being “home.” One friend said they didn’t particularly feel at home anywhere, that they could pack up and go as they please. Others expressed how they wouldn’t want to leave their places of home because of the bonds they felt with the land. As for myself, I fall somewhere in between, able to pack up and go as I please, while still forming a sense of home with the land I inhabit. Over the past year I had the opportunity to live and farm on a beautiful piece of land in West Virginia. Along with the flowers, herbs, and vegetables I grew in the gardens, I made a point to plant as many native plants as I could throughout the meadows and forest. All the while knowing I would be leaving the place with which I was forming a bond.

A few days after that conversation I sat by the stream that cascades down through the forest where I had planted some calamus (*Acorus calamus*) and wild ginger (*Asarum canadense*). A realization came to me. For most of my life I have never lived in the same place for more than a few years. Since childhood I have always been moving. But no matter where I am, I do what I can to make it feel like home. Since my early twenties this has very much involved plants. Even when I know I will be leaving, I devote my time to establishing a garden for food and medicine, meeting the plants that already live there and introducing, (or in most cases re-introducing) new ones. Yes, it can be very hard to leave my green friends behind, but the work is always worth it. I know the plants will continue to grow after I am gone and be a blessing to the next person.

Thinking of the land I recently left, I am happy about the native plants I brought there over the past year: bloodroot (*Sanguinaria canadensis*), wild ginger, wild

yam (*Dioscorea villosa*), sweet Cicely (*Myrrhis odorata*), false Solomon’s seal (*Smilacina racemosa*), wood betony (*Stachys officinalis*), calamus (*Acorus calamus*), echinacea (*Echinacea* spp.), scarlet beebalm (*Monarda didyma*), and butterfly weed (*Asclepias tuberosa*). I think fondly of the green ones that were already there: yarrow (*Achillea millefolium*), goldenrod (*Solidago* spp.), St. John’s wort (*Hypericum perforatum*), ghost pipe (*Monotropa uniflora*), black cohosh (*Actaea racemosa*), and pink lady’s slipper (*Cypripedium acaule*). I planted elderberry, white pine, spruce, and persimmon trees, but oh how the glorious oaks, maples, sassafras, paw paw, and poplar trees that made up the majority of the forest there were ever so gracious to me. All of the green kin in that place I hold so dear to my heart—I will always see them in my mind’s eye and feel their spirits.

In my new home I will continue to plant a garden, re-introduce native plants, and learn as much as I can from my green allies already there. Wherever I am I will do my best to enrich the land as much as possible. Perhaps it is my duty to be a pollinator, spreading love one plant at a time. Perhaps I should walk through the meadows and woodlands casting native seeds wherever I go making the entire world feel like home. I am always hoping the next human finds and recognizes the treasure of plants that surrounds them and that they will learn from the green ones and feel the love and joy that the plants graciously bestowed upon me. ■

A lifelong student of nature, Meaghan grew up exploring the forest and fields around her home as much as possible. Beginning her studies in the Wise Woman tradition, Meaghan went on to study clinical herbalism at Sky House Herb School, followed by studying at Green Comfort School of Herbal Medicine. Spending two years living and working at Sacred Roots Herbal Sanctuary deepened her relationship with the plants by having the opportunity to work hands on with all the green allies she was learning about. Her latest passion has been starting free community wellness days where various alternative healing modalities are available to the public at no cost.

PARADISE FOUND, TRADITIONAL HEALING LOST

By Michele Devlin, Dr.PH. and Mark Grey, Ph.D.

Climate change and severe weather events are displacing people in rapidly growing numbers. The link among climate change, severe weather events, and long-term population shifts is increasingly receiving attention from human rights, migration, public health, economic, and other global professional sectors. Environmentally induced migration involves “persons who, predominantly for reasons of sudden and progressive change in the environment that adversely affects their lives or living conditions, are obliged to leave their habitual homes, or chose to do so, either temporarily or permanently, and who move either within their country or abroad” (IOM, 2007). Furthermore, “gradual and sudden environmental changes are already resulting in substantial population movements. The number of storms, droughts, and floods has increased threefold over the last 30 years with devastating effects on vulnerable communities, particularly in the developing world” (IOM, 2015). Already, millions of people have become climate change refugees or environmental migrants, and their numbers are expected to grow. Forecasts for the number of environmental refugees between now and 2050 range from 25 million to 1 billion (Rigaud, et al., 2018).

While this urgent global public health issue has received significant international attention in recent years, very little research has been conducted on the impact of climate change and forced environmental migration on indigenous healers, traditional medicinal practices, and the future of herbal or plant-based remedies used for hundreds, if not thousands, of years by local populations. To this end, we recently completed a professional development assignment as part of our faculty research duties at the University of Northern Iowa by visiting the remote Pacific nation of the Marshall Islands. We were academic guests there on the island of Ebeye, courtesy of the United States Army Garrison on Kwajalein Island. This wildly beautiful, low-lying chain of sandy atolls is on the frontlines of global climate change,

environmental degradation, and forced human migration and is rapidly going under water as sea levels rise due to melting polar ice packs. The rising seas have made life there more difficult and unpredictable. The highest point on many of the sandy islands is now only approximately 3 meters above sea level, which is particularly risky during increasingly severe tropical storms and rising tides. Drinking water supplies are becoming too salty for human consumption, and even traditional plants no longer grow in this brackish new environment. The waters are warming and changing the environment for coral, fish, and other creatures as well and depleting the historically rich fishing areas there around the islands. Already, more than a third of the population of the Marshalls has left their country for better socioeconomic opportunities and more stable environments in the United States, where they maintain the legal right to work and live due to the Compact of Free Association (PBS, 2018).



Marshallese residents of Ebeye collecting fresh drinking water from the island of Kwajalein to take back to their families

While meeting with local medical professionals, public health providers, and other residents in the Marshalls, one of the topics that we heard a number of concerns about was the loss of traditional medicinal plants and even the emigration of some of the indigenous healers themselves. According to locals, many of the traditional plants that have been used medicinally and spiritually for hundreds of years are no longer growing in outer islands of the archipelago, due to rising sea waters and a degraded environment. The availability of these plants is dwindling due to increasingly salty or brackish water, the erosion

of soil, and/or human overcrowding. Some of the outer islands are no longer hospitable or practical for humans, or certain plants, to live on productively. In fact, on the island of Ebeye, relatively few plants were visible. Much of the rich tropical foliage common on many Pacific islands had long since been removed or died off, due to brackish water supplies and the urgent need for space to build housing shanties to hold the remarkable level of human density that is congregating on larger islands as smaller ones are becoming submerged. We saw numerous residents of Ebeye traveling by ferry to the neighboring island of Kwajalein to bring back fresh drinking water for their families; with space and fresh water limited, even small household gardens with

“...traditional healers and the rich diversity of medicinal plants they have treasured for generations may become victims of climate change extinction in future decades.”

healing and culinary plants are no longer practical to maintain for many.

We greatly enjoyed visiting the local Marshallese museum on Kwajalein that carried a fascinating supply of photographs and displays of traditional medicinal plants and herbal healing remedies used historically in the area. Unfortunately, this rich visual history was countered by the sad stories we heard from locals that their family members and some traditional healers need now to travel to other islands in order to gather certain plant remedies that are no longer available on their own islands due to the changing climate. Some cannot find the plants they need at all for healing anymore. They have fewer remedies to choose from, and much of the historical plant wisdom is being lost for future generations due to the dwindling supply of local medicinal plants.

This body of traditional medicinal plant healing knowledge is further being lost through permanent migration to the United States by the Marshallese. Resettled migrants in states like Iowa where we work typically have little access to medicinal herbal remedies, traditional healers, and the indigenous body of knowledge about the power of traditional plant-based healing. Many of these traditions are also sometimes looked down upon by Western medical providers in refugee resettlement countries and can contribute to a rapid loss of indigenous cultural wisdom in a short amount of time.

With the increase in climate change migration, further attention, research, and sustainability programming needs to be placed on trying to maintain the historic body of knowledge and practices of indigenous people related to their medicinal plants. Traditional healers have often been those people that live most in tune with the

elements of nature around them and have historically been uniquely aware of ways to modify and utilize their environment sustainably to promote the wellbeing of their communities. Their voices, opinions, and ideas must be heard about ways to prevent the loss of these plants and the body of healing wisdom that surrounds them.

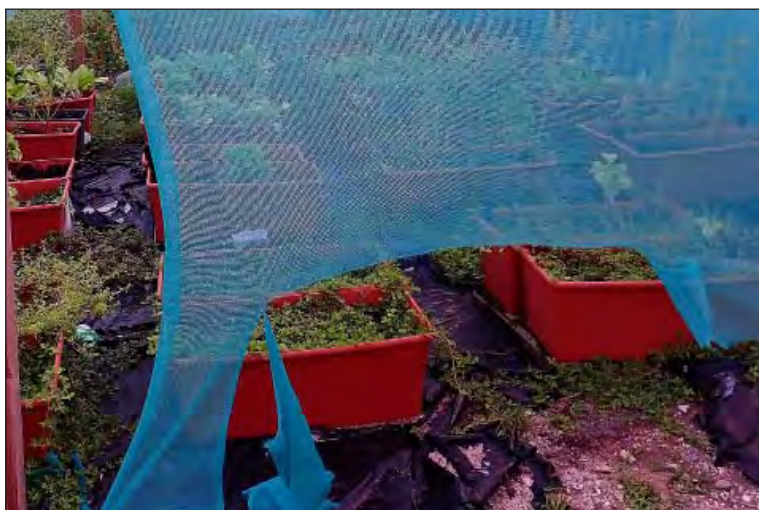
Sadly, if local and global efforts are not taken, both traditional healers and the rich diversity of medicinal plants they have treasured for generations may become victims of climate change extinction in future decades. ■

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Local Leiroj Kitlang Health Center diabetes demonstration garden in Ebeye, Marshall Islands

SAVING PLANTS FROM PIPELINE

by Neal Laferriere

Sitting with my daughter Aislinn at the top of a steep ridge in Highland County, Virginia, we can see for miles. The beauty of this place is stunning. It is April 14th, 2018, and as we look down at the beauty of the valley, our focus is on a 125 foot path. It cuts up over the ridge we are on and continues for more than two miles across the centennial farm below us in the valley before going up the next mountain. It is only marked with orange marking tape.

This 125 foot path is the right of way for the Atlantic Coast Pipeline, and everything on this path is slated to be cut down and dozed. So we take a moment to give thanks for the brushstrokes of nature as we begin our search. Aislinn and I begin our descent looking for native plants that our group can rescue.

On the other side of the valley my wife Beth is leading a small group of herbalists and plant protectors through another area rescuing plants that we had identified on a previous visit. Today we have the venerable Kat Maier from Sacred Plant Tradition (president of United Plant Savers) and several of her clinicians and students helping save the plants in the path of destruction. They are working with hepatica (*Hepatica* spp.), spring beauty (*Claytonia virginica*), and partridge berry (*Mitchella repens*)—beautiful spring ephemerals on death row.

Back on our side as we climb down, we are looking for medicinals and rare plants to rescue. We come across a huge patch of mixed cohosh, black (*Actaea racemosa*) and blue (*Caulophyllum thalictroides*). Interspersed through the patch is bloodroot (*Sanguinaria canadensis*) popping up all over the place. I hit the radio to let our group know we will be moving to this side of the valley.

As the group joins us, we work together to rescue as many of the plants as possible. We spend time with the land owner and a few of her family explaining the properties of the plants. My twins explain the difference between the black and blue cohosh roots (“Blue cohosh roots look like cooked ramen and black look more like worms.”) Working together we rescue hundreds of pounds of roots. We learn about the passion each of us has for the plants, we

laugh, and we share the sorrow of the loss of habitat that this invasive infrastructure project will destroy.

The next day my family and I spend a few quiet moments replanting some of the rescued plants with the land owner in a safe location close to her house.

This is what plant activism can look like!

In our ever progressive world there is a very real need for folks to become more involved with efforts just like this one. From large infrastructure projects like the one I described to road construction, housing developments, to any variety of habitat destruction you can imagine. The plants are losing ground every day.

We may not be able to stop all of these projects and the expansion as our population continues to expand. What we can do is protect the native and at risk plants! We can protect the genetic diversity of plant species! We can take these plants off death row and put them into a protected environment that will ensure they thrive and reproduce.

Our rescued plants found homes at many places including the United Plant Savers plant sanctuary in Ohio, the Rentschler Arboretum, and the University of Virginia Wise County botanical garden. We have given them a new home where they will be used to help educate others on their value. Everyone that volunteers at our rescues also takes a few plants home to plant in their area or gardens.

We chose plant activism for a couple reasons. The first is our love for the plants and the environment. The second is we felt that a proactive approach allowed us to resist these projects with less risk. Third was the ability to create a

positive of something we define as negative.

I would encourage you to get involved! It is not difficult to get started. Find a project near you that is going to take plant habitat. Reach out to the landowners and ask if they will let you rescue the plants.

You would be surprised how many people will be happy to let you do it!

Once you have permission, set a date and call some friends. If possible relocate some of the rescued plants onto the same property.

If you would like more details or have questions about



Annette Nabor one of our rescuers takes the time to commune with a black cohosh (*Actaea racemosa*) plant.



125 ft. wide right-of-way for the Atlantic Coast Pipeline

getting involved, please feel free to reach out to me at [Blackberrybotanicals@gmail](mailto:Blackberrybotanicals@gmail.com) or on our Facebook group, Appalachian Native Plant Rescue. We are happy to help and have permission slips and release forms available to share. ■

Neal Laferriere is the co-owner with his wife Beth of Blackberry Springs Farm and Blackberry Botanical. His love of native medicinals is evident on his sustainable certified organic forest farm in the mountains of West Virginia. Neal and his family have been leading plant rescues across the two Virginias as well as teaching others how to get involved.

Blackberry Botanical is a small family run company that focuses on sustainable products made in small batches with their own certified organic crops. They make medicines, teas, spices and sell small quantities of sustainably harvested products to other medicine makers. For more information on Blackberry Botanicals reach out to us on Facebook or call us at 304-923-3716.



Bloodroot (*Sanguinaria canadensis*) with fairy-like petals greets the dawn along the path of the Mountain Valley Pipeline path. One of the hundreds that were rescued!



Our plant rescue group scours the hillside for hidden botanical friends



Kat Maier and Neal Laferriere Jr. discuss the difference between black and blue cohosh root structure.



A patch of mature American ginseng (*Panax quinquefolius*) sitting in the path of the Mountain Valley Pipeline is ready for rescue!



Ginny Lane and Beth Laferriere work on a patch of Blue Cohosh (*Caulophyllum thalictroides*) plants that need new homes away from the destructive path of the Atlantic Coast Pipeline path

DEEP ECOLOGY ARTIST FELLOWSHIP PROGRAM

This program is available for artists looking to spend time at the sanctuary to explore their artistic perspective in regards to the role of native medicinal plants in the ecosystem through photography, writing, and mixed media.

Deep ecology is an ecological and environmental philosophy promoting the inherent worth of living beings regardless of their instrumental utility to human needs, plus a radical restructuring of modern human societies in accordance with such ideas. Deep ecology argues that the natural world is a subtle balance of complex inter-relationships in which the existence of organisms is dependent on the existence of others within ecosystems. Human interference with or destruction of the natural world poses a threat therefore not only to humans, but to all organisms constituting the natural order.

Art Fellowship Highlights of 2018: Exhibits, Reflections and Art!

We are thrilled to share each fellow's artwork and their passion for deep ecology, exploring how we communicate and advocate for the plants.

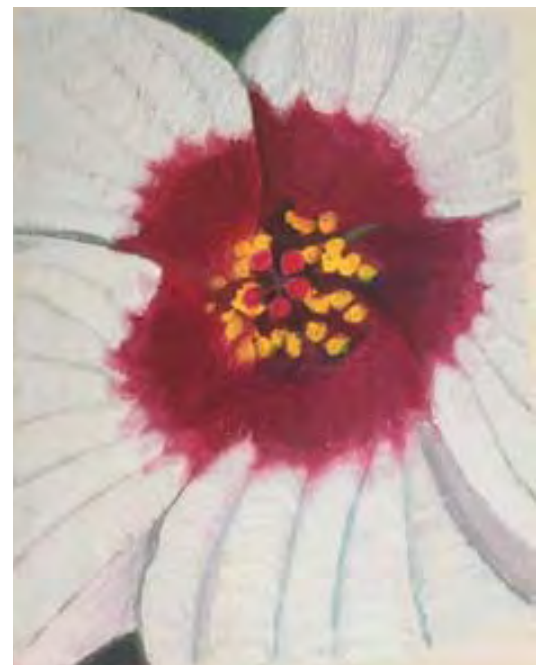


Poems, charcoal, photography and pure magic come to life through space and time when we allow art to consume the day. UpS' Deep Ecology Artists in Residence Fellowship Program participants for summer 2018 included Jesse Lovasco (herbalist/artist from Vermont), Audra Phillips (artist and midwife from Ohio), Sara Haley (art teacher from Florida), and the Cimarron Maz Collective (a cohort of artists, musicians, plant people, and amateur historians).

AN ART FELLOWSHIP

by Jessie Lovasco

*Poems come from the dome in the ceiling of my head
having it slightly opened so air seeps in, but not rain.
No soggy words, but crisp and unexpected metaphors
instead of answers to prayers, questions about flowers.
Not just any flowers but those from medicinal plants.
How to capture them with color,
execute the lines, stimulate memory.
How to make it stick so that walking in the field
one recognizes wild ginger, goldenseal, ginseng.
There are hundreds of plants that never reach our tongue
in speech or by the spoonful. only hope that the purpose
of my stay is to say something ancient in a new way
for the children of my children and anyone who will listen.*





All works above and to the left are by art fellow, Jessie Lovasco

MY EXPERIENCE AT UPS

by Jessie Lovasco

My experience during the Ecological Art Fellowship was deeply awakening. It affirmed the work I do in the world. There was a rich integration of observation, discovery, beauty, connection, art, and poetry that poured through me.

To have a dream realized, to be united with the most potent and precious medicine of our land was exhilarating. Plants that some may never see in their lives I could touch, see, draw, and photograph with no limits on time. I followed the trails as if I were in a church, a sanctuary of primitive voices and birds, messaging as they sensed my presence. I understood that the forest and I were breathing together—that the plants were feeling the heat of the day like I was, hearing the birds and breeze that made its way through every so often. It was an honor, a privilege to be there, joined with the medicines of the earth. And this would be true for anyone who chanced to walk these paths, smell the pungent decay and spring fragrance of forest in layers of green hues and distinct outlines of every leaf.

The nights couldn't have been more peaceful. On the first night, the winds blew lightly. When I woke for water, fireflies were flickering past the windows. An owl was inches away, calling out from a branch.

On summer Solstice, being inside the round yurt was like being in an inner sanctuary; the world around, the outer sanctuary. A hermit thrush landed on a branch outside my window. On a walk, I saw a brown and gold turtle, two pileated woodpeckers, a mother deer and her baby, and later as I was heading down the Reclaim Trail, I saw a buck.

When I walked, there was usually a plant that seemed to call to be represented in art. Sometimes it wasn't even there, like *jack-in-the-pulpit* (*Arisaema triphyllum*), an ephemeral that had gone by. Yet, it continued to speak to me, even as I passed other plants. Because its roots were there, I was walking in its home. It seemed to have a desire to be seen, even if only in a painting.

The clouds had been heavy every day, dumping rain. It kept me from frequenting the outdoors, and the paintings continued to come along steadily. Nothing was there to distract me—no phone, no internet, no interruptions. The work was a meditation, as I chose colors or set up the composition. I attuned myself with each plant, the brilliance of it, the power of its medicine and the grace it brings to the forest and earth.

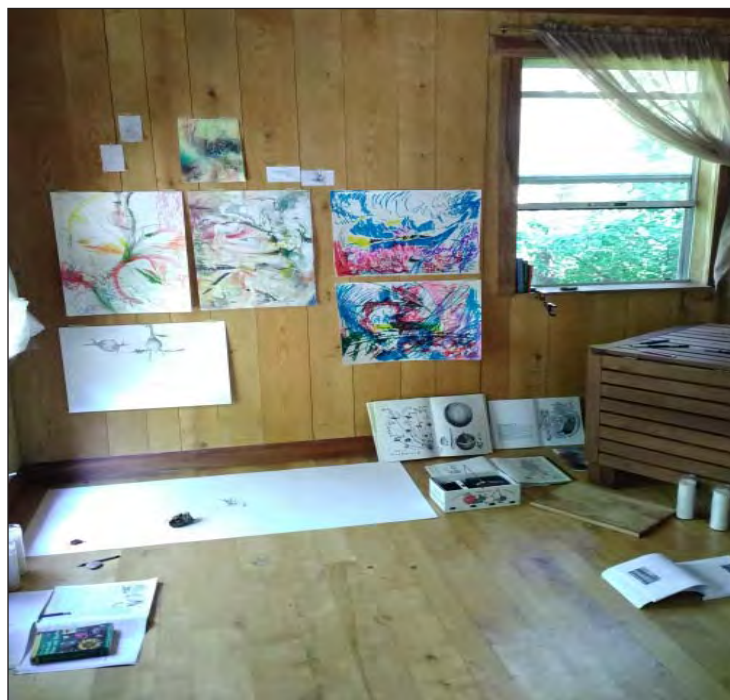
In the quiet and peacefulness of fireflies and long sunsets, solace, and rest, I found myself wondering what to do with the finished work. Selling work for the sake of art is one thing, but these plants had a message. United Plant Savers has a mission that I wanted to uphold. It occurred to me that I would have a traveling show, whereby the art would be ambassadors and represent the work being done at UpS. I could travel with the show, giving talks about UpS and sell cards of the art with a 5% donation going to United Plant Savers.

The first venue of this series of visits will be in Montpelier, Vermont at the North Branch Nature Center in April, May, and June, 2019. The Ecological Art Fellowship art will be hanging in the main room, and the Native American Herbal Alphabet, Mothers of the Sun, will be in the front hall. I will be doing a presentation about UpS and discuss the art and poetry on April 24, 2019. ■

RE-VISIONING BOTANICAL ILLUSTRATION / SCRIBBLING NONSENSE BY CANDLELIGHT

By Sara Haley

Botanical illustrations have come to assume a fairly streamlined form. One may imagine a specimen plucked from its environment to lie gracefully upon a bright, flat void. Each aspect of the plant is individually poised, every structure simplified, salient features exaggerated. The practical impact is that a live specimen can be compared against the illustration and, with some degree of sureness, identified. The aesthetic impact is one of pristine optical



Sara Haley shows her work area at the sanctuary

clarity. I propose that, although useful, this standardized aesthetic is working at odds with essential integrative dynamics of herbalism.

Every clarity of representation is made possible by some level of distortion. For instance, the Mercator Projection, designed in the 16th century for oceanic navigation, forms the basis for our most widely used representations of Earth today. One can imagine the Mercator as having been created by wrapping a cylinder of paper around a glass globe lantern, with the light directed at the equator in the center of the Atlantic Ocean. The projection is most accurate near the source of the light, with increasing distortion around the edges of the paper. Distortions in the relative sizes and shapes of landmasses themselves were allowed in the service of clarifying longitudinal bearing at sea. It is as if our present vision of the planet is still calibrated to the European colonizers' gaze.

Which round dimensions between plants, environments, and humans are being stretched and possibly erased beyond recognition to achieve the standardized clarity of

botanical illustration? Let it be said that this skepticism is not an attempt to categorically reject the form. There's no disputing that this particular aesthetic is precisely aligned to the purpose of cross-identifying plant species and structures. Further, I believe that botanical illustrations make up some of the most wonderful artworks to date.

However, something in the systemization of botanical illustration resonates with the "clinical gaze" proposed by Michel Foucault in *Birth of a Clinic*. The clinical gaze is a filter by which a doctor may observe, ignore, categorize, interpret, and thus construct plans of medical action from the phenomenon of the patient's body. The gaze renders some kinds of information legible while obscuring or rejecting others. In the Western medicine tradition that Foucault described, data for diagnosing acute disease had been clarified at the expense of a holistic body systems view. Thus the clinical gaze, like the Mercator Projection, loses accuracy beyond the bright glow at the center of the doctor's lamp.

But I am not a doctor, nor a cartographer, nor an herbalist. I'm an art teacher passionate and curious about the power of plants, grasping at the limits of my own perspective. How are my limits constructed and reproduced by the images I see, make, and perhaps most importantly, train others to make? Images of plants upon voids, though undeniably striking, are not necessarily intrinsically truer, more naturally valid than those that may be considered "subjective" interpretations.

Several years ago, I heard the story of a European war general and a Native American chief drawing a man on a horse. The man in the general's rendering had only one leg and the man in the chief's drawing had two. As the story goes, both men felt that the other's drawing had been comically distorted. The general tried to explain that one leg could not be seen, as it was hidden behind the body of the horse. The chief tried to explain that Man has two legs whether or not both could be seen from one's own limited position. Which, of these two drawings, is less marred by "subjectivity"? The historic western preference for optical likeness in representation persists today. As my teachers taught me, I instruct my art students to "draw only what you see, not what you think you see" to encourage more realistic drawing. As I teach, I silently wonder what plant illustration mode would be most realistic to a botanist, to a futures trader, to a blind person, to the plant itself, to a fungus, to a cloud.

As herbalists, to what end do we



A visitor admires Sara's work



Artwork by Sara Haley

seek plant illustrations? Certainly, there are moments for the classic scientific aesthetic, especially to ensure safe use of a plant. However, do we seek illustrations only to *use*? Do we *use* only to address bodily phenomena rendered legible as medical disorders? The economic notion of utility, in regards to the environment, has led to enormous progress, but also unprecedented destruction. The forces of climate change that have already devastated countless other species are now beginning to endanger our own. Herbalism, in its countless rhizomatic expressions, seems universally grounded in the pursuit of being in authentic communion with plants. This involves a human-nonhuman partnership transcending human notions of use. So then, how does the standard botanical illustration serve and/or hinder the goal of fostering human-nonhuman partnership? What might it look like to reverse-engineer an illustration form built up from a conceptual ground of a priori human-nonhuman partnership? What aesthetic forms might emerge if visible likeness was stretched and bent to bring clarity to interspecies connectedness?

This line of inquiry is what led me, a 28-year old middle school art teacher from Miami, to participate in the United Plant Savers Deep Ecology Residency. In two weeks, I was hoping to create a new illustration form that could help me transcend the limitations of illustration. Right. What happened in real life was that I arrived at the Sanctuary and immediately felt a little foolish. I'd anticipated hiking around and finding plants and *knowing*, just *knowing* in an irrepressibly logical way how we were all enmeshed. Part of my proposal emphasized the value of a plant being alive in its environment for drawing. I ran into the snag of *how could I know* all the ways a plant is interfacing *without seeing* the total system? What about the fungus in the ground supporting the flow of nutrients to roots? What about the mineral composition of the soil? What of all the microscopic stuff going down?

I wanted to accurately represent these immensely complex, yet hidden, yet very real flows between things

in a way that was still unintentionally of the standard illustration gaze. I was diagnosing importance based on the same clinical grammar I'd been hoping to move past. Not to mention that when I did get out, I quickly learned how many, spiky, moist, itch-inducing, venomous, buzzing forces there were to attempt to ignore while drawing in the field. I discovered the massive gap between sensory overload of actual experience and the neatness that had been proposed to me by plant illustrations. Drawing in the forest, I felt an intense craving to achieve such an order not only by the drawings I would make, but also in my very *perception*. It struck me that illustrations are

both artifacts of subject-object relationships and equipment for reproducing these relationships. That is, one's gaze bears creative force in and of itself.

For a few days, I opted to study indoors. My hope was that I might learn enough to get the most out of the experience "out there." I'd read and read and then charge out of the library with 99% of my body covered, fifteen pounds of art supplies, and my spiderweb stick twirling. I was, myself, a slapstick comedy. In time, though, I dropped it all, all those goofy barriers. First to fall was the frantic reading. I began wandering for longer and longer intervals. The total body shield and the spider web destroyer were next to go. I moved to the off-grid wood cabin in the forest uphill. I stopped lugging the art supplies around when I realized that what felt like the truest drawings were the

energetic nonsense candlelight scribbles before bed. This freed up my body, mind, and daylight to simply exist with and within the ecosystem. I felt at times dissolved into the place. I'd previously sought the forest for solitude. What was emerging was instead an immersive awareness of life throbbing around and of me. How classic, right? This narrative of self discovery in a forest. So it is; there I was.

When I was actually making hard efforts at proper illustration, I kept returning to the thought that illustrations may signify a brokenness between subject and object. Cultures with a close connection with plants and cultural traditions seem to get along fine without

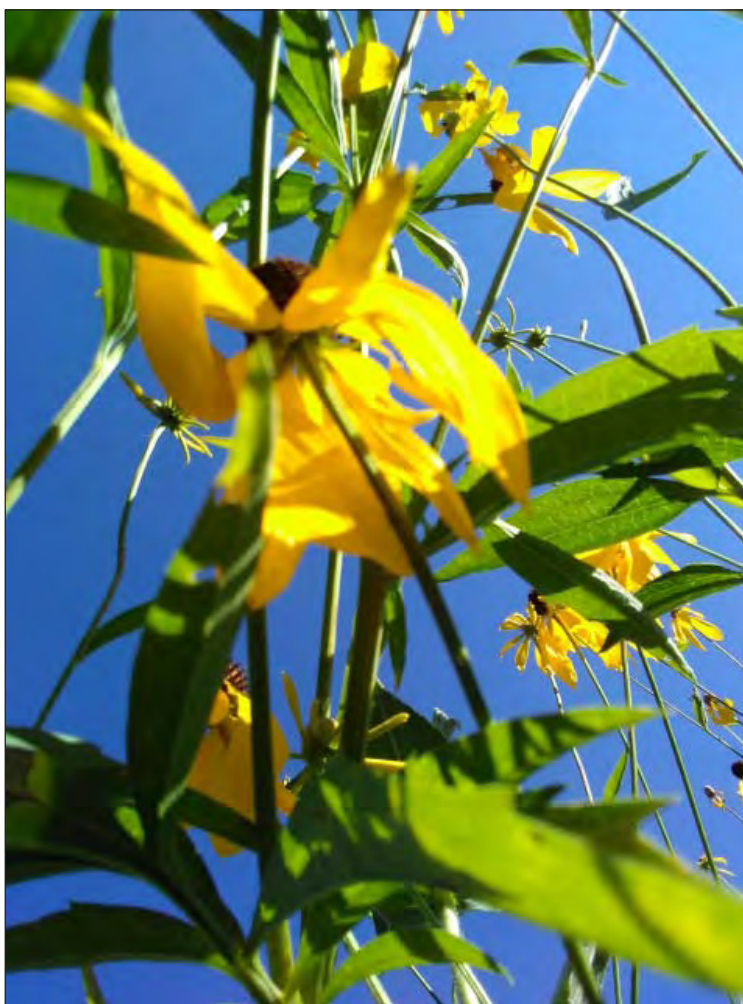


Photo by Sara Haley

a visual archive. Or any kind of external archive, really. The wisdom is passed down orally between people and energetically between one's self and plants. In the absence of a body of records, wisdom is not stored but rather electrifies the relationships between generations, between the plants and people. In contrast to a reference book that may lie inert on a shelf, I could imagine constant care would be needed in the traditional system to keep the circuitry humming. I consider how when I look at a lushly explicit botanical illustration, there's a level of trust that I have in the representation and a passivity that I feel in relationship to it. That drawing's got it all in there. I consider how different it would feel to be of a more environmentally-oriented culture as an elder shared their knowledge of a plant. I can imagine leaning in to attune myself to most fully receive their soft, fleeting words. I would become a bearer of something irreplaceable.

But I am not of such a culture. I am programmed to first seek man-made artifacts to learn about my immediate surroundings. It is what it is. For years leading up to the final days of my Deep Ecology experience, I'd been somewhat mournful to be a product and unintentional re-producer of this systematic brokenness. However, walking through the forest shortly before my fellowship closed, I encountered a snapped slippery elm (*Ulmus rubra*) tree that melded in my mind with, appropriately, a book, that would

destabilize this perspective. Specifically, I was reminded of Martin Heidegger's broken tool analyses from *Being and Time*. Although some elements of this book have problematic social implications, I'm deeply inspired by the German philosopher's proposal of how equipment or tools have a quality of springing to life when they stop working. That is, when equipment is doing what it is designed to do, it can be considered to exist as an ideal outside of our space and time. When the equipment is broken, it is momentarily freed from the vacuum of that purpose, and must be beheld in the fullness of its immediate material form.

Maybe there's some power in considering the contemporary western human society as broken

components of the planetary equipment. I can get so sucked into my utility that I lose the capacity to detect my own experience. For instance, it was only once I'd finally let go of extracting a cohesive set of data for illustrating the forest that I could begin attuning to its throbbing presence. Something similar seems to be occurring on a larger human scale as well, evidenced by the devastation driven by abstract economic tools on vast physical landscapes. Map-making, western medical diagnosis, botanical illustration, and public school art instruction are all oddly alike in that they are specialized tools to serve specialized ends. In their own processes, each produces



Artwork by Sara Haley

images of the world that, in turn, reproduce not only the content but also the gazes of their makers. It seems that in aiding expert execution, specialized gazes can also perpetuate limited perceptions. Thus, I propose a practice of the regular relinquishment of utility and playful consideration of one's own brokenness. May this momentary freedom attune one to one's own pure sensations as if to a whispering elder. Perhaps such practice could electrify the dormant circuitry between one's self and all else.

Then there's the elm that had snapped and fallen and reminded me of that thing I'd learned from a book about being. It was broken yet dissolving to become everything else. Elm as elm was broken, but maybe that was my construct of me that was broken. I blinked, vanished,

and everything keeps humming along. ■

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GINSENG TELLINGS

NOTES FROM THE FIELD

Cimarron Maz Collective

As a group of artists passionate about storytelling, we are so happy to have ginseng as our focus. Our stay at the United Plant Savers Plant Sanctuary in November 2018 was an adventurous and illuminating journey into many of the narratives around the legacy of American ginseng (*Panax quinquefolius*). Pictures featured here are snapshots of our collective's art-making, research, and of course, hunting down American ginseng. We want to especially thank John Stock and Chip Carroll for the time they have spent coordinating and sharing their knowledge with us so far.

A bit of background about our project: Cimarron Maz Collective was formed in early 2018 and is a cohort of artists, musicians, plant people, and amateur historians. The aim of our project is to create a cross-cultural, multi-layered and multimedia storytelling experience, using interviews, music, writing, and puppetry as our mediums. We are currently in the research and development stage of our project.

A bit about our process: our time at UpS was (and will in the future be) about getting to know American ginseng and its indicator plant community. While we were there, we connected with Chip Carroll, who shared stories from his decades-long experience of working with this plant, to the extent that one person commented after his departure that they felt like they were "living in a documentary." Senza Infinite and Aaron Morgan worked on creating soundscapes and video of our improvised recordings, and Micah Li and Bugz Fraugg started to workshop the puppetry end of our process. Biotunes artist Loretta Maps Bolt lead our group in gathering plant audio from different plants in ginseng's habitat. This is done by translating the plants' electrical resistance into musical notes. We will be using these sounds, gathered seasonally, along with samples gathered from interviews, to create a musical and narrative backdrop that will form the puppet show.

Our project is concerned with the ways in which we tell our lives into being. The way that our histories have been shared have been limited in their scope, just as the ways that we interact with the earth in modern society alienates us from the source of our lives. By

illuminating the stories so long ignored by the history books and weaving them together with the literal songs of the earth and stars, we aim to inspire reverence and response to our planet and create popular culture that centers plant preservation. If you or someone you know might be interested in participating in our project, and most especially if you are from First Nation, Appalachian, African American, or East Asian ancestry and are familiar with ginseng's growth region, trade, or culture we would very much like to talk to you! We also welcome participation from anyone to whom this plant is important and to whom this manner of tender interspecies collaboration is meaningful and motivating, regardless of your origins. This invitation most definitely warmly welcomes LGBTQ2S+ folks as well.

Finally, if you are from an Amazonian nation and have an interest in, or knowledge of birds, we have learned that the only currently known animal helper of American

ginseng is the migratory wood thrush. The wood thrush winters in the Amazon, and so we become aware of the global significance of every living thing, by considering the importance of the Amazon to the continued well-being of ginseng. All told, there are many ways to participate in this project, and we need your help. We would like to mention that this project is currently entirely self-funded and we need financial support. If you would like to participate or if you would like to donate to help us

complete our seasonal returns to gather plant recordings, please contact us at cimarronmaz@gmail.com.

One last announcement! We have begun exploring the possibilities of collecting donations to be able to travel to Haudenosaunee communities with ginseng plants to rematriate these powerful medicine plants by sharing ginseng stories with one another and planting them together. In the upcoming months we will be seeking donations of seeds, plants, legal advice/licensing, and funds to realize this effort.

Thank you for having a look at our work-in-progress report. We're very excited to be doing this! For more information and to stay in touch please join us on social media: www.facebook.com/CimarronMaz and at our website: www.cimarron-maz.com or email us at cimarronmaz@gmail.com. We look forward to connecting with you! ■



Senza Infinite greets the dawn. We made sure to spend some contemplative time in the woods towards the end of our fall recording and work sessions at the UpS Botanical Sanctuary.



Aaron Morgan on the first frosty morning of our stay.



Between team-building exercises. Cimarron-Maz members met in person together for the first time in November 2018 at UpS to get to know each other, meet ginseng, and continue collaboration.



Using the electrical resistance in plants, we translate the data into musical notes. Plant hunting is a big part of the process of making music with plants, and ginseng is a great example of this. To interpret the consciousness and agency of plants, compositions of plant soundscapes are recorded in the field.



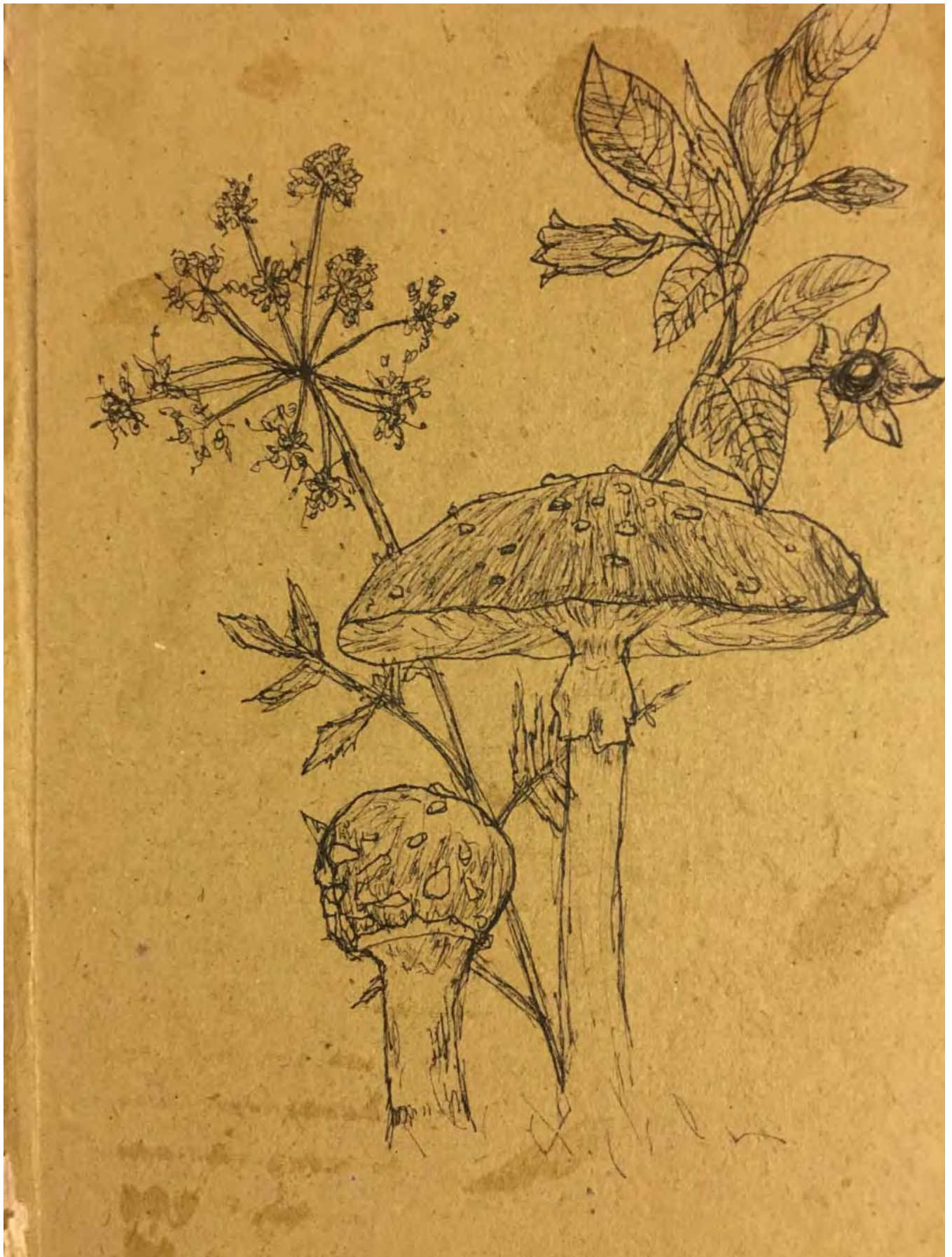
Using technology like EEG pads can reveal new aspects of a plant's life in the wild. Attaching these pads to a variety of plants during our stay was an exciting musical journey. We heard melodic expressions from the plants in a number of genres—from sleepy time melodic ginseng to the high energy rattlesnake fern tones.



Micah Li working on a "Cranky" puppet. This is a method of puppetry that we are exploring for our narrative creation as we explore these Ginseng Tellings.



Shooting a scene with ginseng, frog, and snail puppets for a future music video showcasing our time at UpS in November 2018. This was an experiment, as it was our first time combining puppetry and film skills.



Poisonous Plants by Katy Pawlick

MOON TEA

Reflections from Katy Pawlick, Medicinal Plant Conservation Certificate Program Graduate

The picture below was inspired by the little recollection I wrote below. The second is of some poisonous plants that I drew sometime last summer for fun. I've included it because I like it a little better (I'm not really used to watercolor yet). The plants are Amanita muscaria, poison hemlock, and dolls eye. Dolls eye was a new plant I learned about and saw when I was at UpS!

One of my favorite things to do at the United Plant Savers sanctuary was sit up in the yurt alone and read through Rosemary Gladstar's giant lesson book. A chapter I really enjoyed was on lunar infused tea. She wrote about collecting the herbs under the full moon, placing them in a glass bowl overnight, and letting the tea infuse.

I ran around the gardens barefoot under the full moon and picked raspberry leaves, spearmint, evening primrose — maybe yarrow too. I went out into the field and stared up at the moon for a long time. I remember the moon seeming to glow so bright at me, I thought the other interns were returning from the paw-paw festival and their headlights were shining on me. I spun around, but there was no car; it was just the light from the moon in front of me. I've never really told anyone about this until now. It felt surreal and special.

I left the herbs and water under the moon all night. The next morning I retrieved it, strained it, and took a sip. I was shocked at how strong and alive it tasted. It was mellow after a few sips, but that first taste really made me feel something. Rosemary wrote about how the moon brought out different energies of the plants.

I loved all of the events and learning at the sanctuary, but also valued the alone time with nature like this so much. It was something very personal and healing. ■



Evening Primrose by Kay Pawlick



Northern Spicebush (*Lindera benzoin*) | A. Nonenmacher [CC BY-SA 4.0]

"The other traditional Cherokee use of spicebush is as a beverage made from twigs, bark, leaves, and fruit offered as a 'peace treaty' inducing tea. The beverage is used to start negotiations with enemies as a token of friendship and peace. If we use the 'old way' of making peace within our environment and ourselves, then the state of health is established because we are living in a disease-free state. As long as we have destruction of our Planet (the Mother of us all, EARTH), and as long as we have War, Poverty, and Discrimination amongst the peoples of the EARTH, we can never have true health and be disease free...unless we make friends out of our Enemies! So, go out and gather some spicebush tea and enjoy for the betterment of your health, your environment and for the 'greater good' of making Peace."

— Journal 2010,
Dr. Jody E. Noé, MS, ND



Photo by Audra Phillips

AUDRA PHILIPS

ARTIST'S STATEMENT:

The Sanctuary holds a special place in my heart. I first visited 20 years ago, when a friend invited me to sit in on a class taught by Rebecca Wood and Paul Strauss. I remember driving down McCumber Rd. and feeling a change in the air and a sweet energy emanating from the woods. Over the weekend on the land we learned about Paul's incredible reverence for the plants and land, and his vision and hard work to create the Sanctuary. We experienced the beauty and magical spirit of the place. I have been drawn back to the land and surrounding community many times since that first visit. It always feels like a return to home, and seeing the plants is like greeting old friends. Over the years, I have also come to realize the richness and diversity of plant life at the Sanctuary, making it a truly unique place in the world.



Painting by Audra Phillips



SACRED SEEDS

To read about and connect with sacred seed gardens around the world visit

www.sacredseedssanctuary.org

Sanctuario Semillas Sagradas, Finca Luna Nueva: Costa Rica

Missouri Botanical Garden: United States

Semillas Sagradas de Huamachuco: Peru

Crow Creek Indian Reservation: United States

Ambalabe: Madagascar

Jardin Botanico de Semillas Sagradas de Chan Chan: Peru

Sacred Seeds at the Intervale Center: The Abenaki Heritage Garden: United States

Rodale Institute: United States

Bastyr University: United States

American Botanical Council: United States

Sitting Bull College: United States

Kindle Farm School: United States

The Green Farmacy Garden: United States

Hosagunda: India

Jardin Botanico Medicinal de los Llanos: Colombia

Sacred Seeds at Reserva Natural La Pedregoza: Colombia

Institute of Ayurveda and Integrative Medicine - I-AIM: India

Native Forest Foundation: Sri Lanka

Tel Aviv University Botanical Garden: Israel

The Rattanakiri Living Library for Seeds and Culture: Cambodia

Bronx Green-Up: United States

Chaikoni Jonibo Garden: Peru

Forest School for Traditional Health Practitioners - PROMETRA Uganda: Uganda

Punta Mona Center for Sustainable Living: Costa Rica

Goldenseal Sanctuary: United States

L'Herboretum: France

IITA Forest Reserve Ethnobotanical Garden: Nigeria

Jardin Etnobotanico Pueblo Chacobo-Pacahuara: Bolivia

Southern Cross University Medicinal Plant Garden: Australia

Bakuriani Alpine Botanical Garden: Georgia

Tertulias Herb: United States

Tafi Atome Monkey Sanctuary & Cultural Village: Ghana

Maryland University of Integrative Health (MUIH) Herb Garden: United States

Florida School of Holistic Living Bodhi Garden: United States

Pha Tad Ke Botanical Garden: Laos

Forest Garden Organics (Pvt) Ltd: Sri Lanka

Holt Woods Herbs: England

Spirit of the Earth Living Center: Canada

Hidden Garden Ethnobotanical Sanctuary, Costa Rica

NEWS FROM HOLT WOOD HERBS

by Anne Stobart

A medicinal forest garden in the UK

Anne Stobart is a clinical herbal practitioner and grower based in the UK. She was an intern at the Ohio Botanical Sanctuary in autumn 2010. She says, "In Ohio, I gained a deep respect for the plants and the people struggling to protect them and gathered many ideas for more sustainable cultivation and harvest back in the UK." Since then the project Holt Wood Herbs, founded by Anne and her partner in the South West of England, has continued to grow, transforming an old conifer plantation into a vibrant medicinal forest garden. The aim has been to develop experience in cultivating and harvesting a range of medicinal trees and shrubs suitable for a temperate climate. At Holt Wood, Anne is growing both native and introduced plants. Using alternative herbs to endangered species and reducing air miles in imported herbal supplies have been key factors in deciding what to grow and harvest. For example, antispasmodic bark is harvested from native coppiced shrubs such as cramp bark (*Viburnum opulus*), while the young leafy twigs of introduced Virginian witch hazel (*Hamamelis virginiana*) are gathered for distillation into an antiinflammatory water.

Support for organic herb growers

In January 2018, Anne joined with a herbal practitioner colleague in organising a session on developing UK herb cultivation at the Oxford Real Farming Conference (ORFC). The ORFC is a stunning and eclectic yearly get-together of people from all kinds of growing contexts — agroforestry, organic farming, forest



Growing Virginian Witch Hazel (*Hamamelis virginiana*)

gardens, permaculture, and more. Subsequently, in 2019, a new Organic Herb Growers Co-operative is being launched in the UK, aimed at supporting herb growers using organic methods. Many herbs are imported for cosmetic, culinary, and medicinal use from Europe and the USA but could be grown or harvested in the UK. Despite FairWild and other initiatives, these imported herbs are often wild-harvested with little attention to sustainability or regeneration of plant populations. There are growing opportunities for UK organic farmers since the herb market continues to expand and, due to customer demand, manufacturers and producers are looking to ensure the sustainable provenance of supplies. It is planned that the Organic Herb Growers Co-op will help to link growers and producers while promoting networking and training to ensure the quality of herbal supplies.



Anne harvesting Cramp Bark (*Viburnum opulus*)

Courses in medicinal trees and shrubs

Meanwhile, short courses are run at Holt Wood about designing a medicinal forest garden and harvesting medicinal trees and shrubs. A new course planned for 2019 is “Medicinal Herbs in Historical Practice”, in which participants will learn about native wild plants harvested in the seventeenth century and explore traditional preparations. Anne is currently writing a book on cultivating and using medicinal trees and shrubs in a temperate climate, *The Medicinal Forest Garden Handbook*. It will be published in early 2020 by Permanent Publications. You can see more about the Holt Wood Herbs project at <https://unitedplantsavers.org/holt-wood-herbs/> and see the website blog at www.holtwoodherbs.com ■



The medicinal forest garden at Holt Wood, Devon, UK

THE FRLHT-TDU STORY OF CONSERVATION AND SUSTAINABLE USE OF MEDICINAL FLORA

By Darshan Shankar



FRLHT-TDU Campus landscaped with 1500 species of Medicinal Plants

1. THE PRIMACY OF MEDICINAL FLORA IN FOREST HABITATS

A little known fact regarding the species composition of Indian forest flora is that 40-70% of the flora across ecosystems and all the six vegetation types viz., tropical evergreen rain forests, deciduous or monsoon type of forests, principal dry deciduous forests and scrubs, semi desert and desert vegetation, tidal or mangrove forests and mountain forests are species of medicinal values¹. This makes medicinal plants the largest plant taxon in forest flora. In certain ecosystems easily accessible to human communities like the deciduous forests the proportion of medicinal taxa in the forest flora can be as high as 70%. In evergreen forests due to their inaccessibility it may be lower. A little reflection on this information may replace surprise with understanding about the reason for this high proportion and composition of medicinal plants in the floristic diversity in various habitats. The source of information about medicinal plants is from local human communities. The human need of plants is for food, fuel, housing, crafts, clothing and medicine. The number (not quantity) of species needed for food, fuel, housing etc. is far smaller than the species needed and discovered for their medicinal values for human, animal and agricultural use. Hence not only in India but across all societies in Asia, Africa, Latin America and even Europe, it is the fact that communities use the largest number of wild plants for healthcare. It is known that the first botanical garden in Europe in modern times was a physic (medicinal) garden established in the University of Pisa created by Luca Ghini in 1543². In India and several developing countries, the use of plant life for healthcare was a practice since 3000 BC, and it has remained

a living tradition until now when millions of homes, community healers, folk veterinarians and farmers continue to use ecosystems specific medicinal plants.

1.1 Profile of India's medicinal flora.

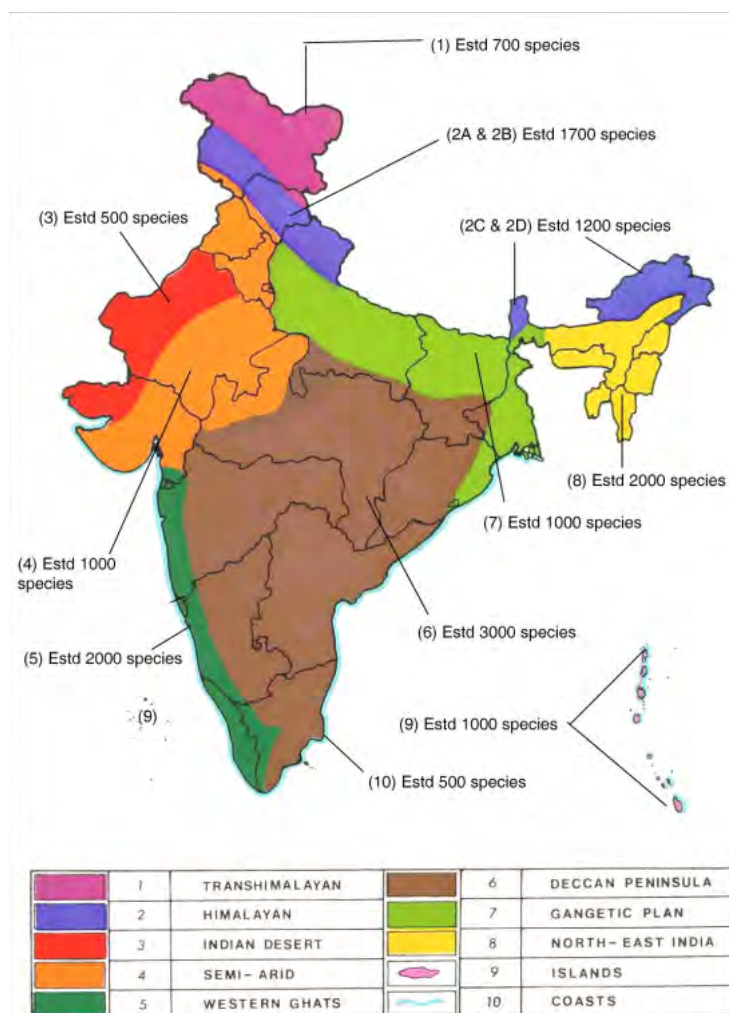
An unambiguous and bold definition of "medicinal plant" is provided in traditional knowledge systems in India. The 6th century Ayurvedic text, *Ashtanga Hrudayam* gives an extremely emergent definition of medicinal plants as below.

"Jagatyevam anaoushadham na kinchit Vidyate dravyam vasatnanartha yogayoh³"

This verse means that every plant has potential medicinal properties. However, at a particular stage of social history, plants are declared to be medicinal only when their properties or uses have actually been discovered by some system of medicine or health care. "Medicinal Plants" may thus be defined as those botanicals listed and used in Ayurveda, Siddha, Sowa-Rigpa, Unani, Homeopathy, Allopathy and the ecosystem and ethnic community specific folk systems of medicine⁴.

A staggering 6581⁵ species of medicinal plants are in use in more than 250,000 (TKDL - CSIR)⁶ unique formulations across these healthcare systems. This extent of the use of diverse botanicals is perhaps the largest in the world. The medicinal plants are sourced from all habitats and landscapes across the country from the trans-Himalayas to the coastal regions, from arid and desert habitats to mangroves and evergreen forests. Related to medicinal plant resources there exists sophisticated systemic knowledge of biology, pharmacology, diagnostics, therapy and pharmacy, which is documented in around 100,000 traditional medical manuscripts.

With the advent of cutting edge research in the frontiers of genomics, transcriptomics, proteomics, metabolomics, systems biology, pharmacogenomics and combinatorial chemistry, scientists are beginning to rediscover the



Medicinal Plant species in the Bio-geographic zones of India

value of systemic knowledge alongside their vast repository of natural resources.

The table below (TDU database 2019) enumerates the number of species used across different systems of healthcare in India.



Aconitum heterophyllum



Commiphora wightii



Santalum album

Indian System	Ayurveda	Folk	Folk (Vet)	Homeopathy	Siddha	TCM*	Tibetan	Unani	Western
Ayurveda	1537	773	310	176	756	360	246	427	74
Folk	773	5215	283	161	771	672	186	330	80
Folk(V)	310	283	545	47	300	137	82	111	14
Homeopathy	176	161	47	489	145	128	69	136	102
Sidha	756	771	300	145	1147	289	209	334	59
TCM	360	672	137	128	289	880	109	205	80
Tibetan	246	186	82	69	209	109	250	177	23
Unani	427	330	111	136	334	205	177	493	63
Western	74	80	14	102	59	80	23	63	190
Total									6581

TABLE: TDU database 2019

As per a published report of NMPB (2017)⁷ out of 6500 medicinal plant species traditionally used by Indian communities, only 1622 botanicals corresponding to 1178 plant species are found to be in all India trade. Of these 42% are herbs, 27% trees and 31% are shrubs & climbers. Only 242 species witness high volume trade (>100 MT) annually. The major botanical families to which these species belong to are Fabaceae, Asteraceae, Lamiaceae, Malvaceae, Euphorbiaceae, Acanthaceae, Apocyanaceae, Caesalpiniaceae, Solanaceae, Convolvulaceae, Mimosaceae, Phyllanthaceae and Rubiaceae. Diverse parts of plants (leaves, flowers, fruit, seed, bark, root, resin, gum) serve as medicinal raw drugs. Nearly 53% of the medicinal plant species are subject to destructive methods of harvest, as the medicinal parts harvested include underground parts, wood, bark & whole plant. It is observed that 85% of the traded species and 70% of the demand are met from wild sources.

High Volume Traded Medicinal Plant List prepared by FRLHT

S.No	Botanical Name	Trade Name(s)	Major	Estimated Annual	Rate
1	Abelmoschus moschatus	<i>Muskdana, Kasturilatika, Kasthuri vendai</i>	C	100-200	100-150
2	Abies spectabilis	<i>Talispatra, Talisa</i>	HF	100-200	50-60
3	Abrus precatorius	<i>Kunnimuthu, Kundumani, Gundumani, Gunja</i>	W	200-500 [≈110]	90-110
4	Abutilon indicum	<i>Tutti Atibala</i>	W	100-200	25-Oct
5	Acacia catechu	<i>Katha</i>	TF	500-1000	750-1600
6	Acacia nilotica subsp. indica	<i>Babul, Kikar, Babbula, Karuvelum</i>	TF	1000-2000 [≈520]	75-125
7	Acacia senegal	<i>Gum Arabic, Char Gond</i>	I	>20000	100-300
8	Acacia seyal	<i>Gum Arabic, Talha Gum</i>	I	2000-5000	100-300
9	Acacia sinuata	<i>Shikakai</i>	TF	1000-2000 [≈90]	25-95
10	Acalypha indica	<i>Khokali, Haritamanjari</i>	W	100-200 [≈365]	
11	Achillea millefolium	<i>Brinjasif, Yarrow</i>	HF	100-200	150-250
12	Achyranthes aspera	<i>Puthkanda, Apamarga, Nayuruvi</i>	W	200-500 [≈2750]	25-35
13	Aconitum heterophyllum	<i>Atiss, Ativisa</i>	HF	100-200	3500-10500
14	Acorus calamus	<i>Bach, Ghorbach, Vaca</i>	C	500-1000 [≈165]	50-65
15	Aegle marmelos	<i>Bael, Belgiri, Bilva, Vilvam, Bael guda</i>	TF	2000-5000 [≈10600]	15-35
16	Aerva lanata	<i>Cheroola, Pa ura</i>	W	100-200 [≈200]	

S.No	Botanical Name	Trade Name(s)	Major	Estimated Annual	Rate
17	<i>Albizia amara</i>	<i>Krishnasirish, Usilai</i>	TF	100-200	15-Oct
18	<i>Alhagi pseudalhagi</i>	<i>Durlabha, Yavasaka</i>	W	100-200	
19	<i>Aloe vera</i>	<i>Kumari, Gwarpatha, Kanyasara, Elva,</i>	C	>10000	10-Aug
		<i>Kumari, Soththu katrazhai</i>		[≈3260]	
20	<i>Alpinia calcarata</i>	<i>Chi aratha Granthimula</i>	C	100-200	
21	<i>Alpinia galanga</i>	<i>Rasnamool, Kulanjan, Perarathai</i>	C	200-500	100-130
22	<i>Amorphophallus paeoniifolius</i>	<i>Surankand, Surana</i>	TF	200-500 [≈90]	
23	<i>Anacyclus pyrethrum</i>	<i>Akarkara, Akarkarabha, Akraharam</i>	I	200-500	200-250
24	<i>Andrographis paniculata</i>	<i>Kalmegh, Neela vembu</i>	TF	2000-5000 [≈2080]	30-Oct
25	<i>Argyrea elliptica</i>	<i>Bondvel</i>	W	100-200	
26	<i>Arnebia benthamii</i>	<i>Gauzaban</i>	HF	100-200	150-220
27	<i>Artemisia annua</i>	<i>Artemisia</i>	C	1000-2000	150-200
28	<i>Asparagus adscendens</i>	<i>Musali safed, Satawar</i>	HF	200-500	250-400
29	<i>Asparagus racemosus</i>	<i>Shatavari, Shatawar, Satavari</i>	TF	2000-5000 [≈675]	300-500
30	<i>Atropa belladonna</i>	<i>Belladonna</i>	I	200-500	150-200
31	<i>Azadirachta indica</i>	<i>Neem, Vaeppan, Nimba</i>	C	2000-5000 [≈9090]	15-30
32	<i>Baccharoides anthelmintia</i>	<i>Kali zeeri, Somnay, Vanyajiraka</i>	W	200-500	80-500
33	<i>Bacopa monnieri</i>	<i>Jal Brahmi, Brahmi</i>	W	1000-2000 [≈140]	30-50
34	<i>Baliospermum montanum</i>	<i>Dan mool, Dan</i>	TF	100-200	
35	<i>Barleria prionis</i>	<i>Vajradan, Sahacara</i>	W	100-200	
36	<i>Bauhinia variegata</i>	<i>Kachnar, Kancanara</i>	TF	100-200 [≈20]	180-250
37	<i>Berberis aristata</i>	<i>Daruhaldi, Daruharidra</i>	HF	1000-2000 [≈50]	15-55
38	<i>Berberis lycium</i>	<i>Daryhaldi, Chitra</i>	HF	1000-2000 [≈285]	15-55
39	<i>Bergenia ciliata</i>	<i>Pashnabhed, Pasanabheda</i>	HF	1000-2000 [≈125]	35-55
40	<i>Betula ulis Bhojpatra</i>	<i>Bhurjah</i>	HF	100-200	125-300
41	<i>Boerhavia diffusa</i>	<i>Punarnava, Mukara ai, Punarnava rakta</i>	W	2000-5000 [≈1050]	35-45
42	<i>Bombax ceiba</i>	<i>Mochras, Semal, Salmali</i>	TF	100-200 [≈445]	140-160
43	<i>Boswellia serrata</i>	<i>Guggul dhupa, Mani kundrikam Kunduru</i>	TF	500-1000	100-300
44	<i>Buchanania cochinchinensis</i>	<i>Chironji, Priyala</i>	TF	100-200	450-500
45	<i>Butea monosperma</i>	<i>Tesu phool, Palas phool, Murukkam, Palasa</i>	TF	200-500 [≈605]	15-20
					35-45
					150-350

S.No	Botanical Name	Trade Name(s)	Major	Estimated Annual	Rate
46	Caesalpinia bonduc	Sagargota, Kalaachi kaai, Latakaranja	TF	100-200 [≈715]	80-120
47	Calendula officinalis	Gulasharfi, Genda, Marigold	C	100-200	15-Oct
48	Capparis spinosa	Kanther, Himsra	W	500-1000	
49	Cardiospermum halicacabum	Mudakkathan, Karnasphota	W	100-200 [≈4500]	15-30
50	Cassia fistula	Amalthas Aragvadha	TF	200-500 [≈840]	15-Oct
51	Catharanthus roseus	Sadabahar, Vinca	C	200-500 [≈250]	125-175
52	Cedrus deodara	Devdar, Devadaru	HF	1000-2000	25-40
53	Celastrus paniculatus	Vaaluluvai, Malkangani, Jyotismati	TF	200-500	110-200
54	Centella asiatica	Brahmiboo, Vallaarai, Mandukaparni	W	500-1000	200-250
				[≈1870]	50-100
55	Chaemecrista absus	Chaksoo	W	100-200	350-450
56	Chlorophytum borivillianum	Safed musali	C	100-200	700-1800
57	Chlorophytum tuberosum	Safed musali	TF	200-500	700-1800
58	Chrysopogon zizanioides	Lavanha, Khas, Usira	C	200-500 [≈1355]	70-100
59	Cichorium intybus	Kasani	C	500-1000	75-140
60	Cinnamomum cassia	Dalchini	I	100-200	150-175
61	Cinnamomum sulphuratum ⁴	Dalchini, Tejpa a	TF	100-200	150-200
62	Cinnamomum tamala	Tejpa a Tvakapatra	HF	2000-5000 [≈155]	65-80
63	Cinnamomum verum	Dalchini, Tvak	C	200-500	170-190
64	Cissus quadrangularis	Hutjodi, Pirandai, Asthisamhrta	W	200-500 [≈5270]	40-55
65	Citrullus colocynthis	Indrayan, Indravaruni	W	200-500 [≈520]	20-30
66	Clerodendrum phlomidis	Arni, Arnimul, Agnimantha	W	200-500	35-45
67	Clerodendrum serratum	Bharangi, Bharangi	W	100-200	35-45
68	Coleus forskohlii	Gandira Pashan Bhedi	C	100-200	60-190
69	Commiphora wightii	Guggul, Guggulu	TF	1000-2000	650-1000
70	Convolvulus prostratus	Shankapushpi, Sankhapuspi	W	500-1000	20-30
71	Coptis teeta	Mamira, Rohini	HF	100-200 [≈70]	500-600
72	Crateva religiosa	Varun chhal, Varuna	TF	200-500	30-50
73	Cullen corylifolium	Bawachi, Bakuchi	W	200-500	55-75
74	Curculigo orchioides	Nilapanai Kali musali, Talamuli	TF	200-500 [≈135]	180-220
75	Curcuma zerumbet	Kachur Karcura	C	200-500	25-35
76	Cymbopogon citratus	Rohisha, Ka rna	C	100-200 [≈135]	120-150
77	Cymbopogon flexuosus	Lemon grass	C	100-200	120-150
78	Cynodon dactylon	Doob, Durva	W	100-200 [≈2950]	20-25
79	Cyperus rotundus	Motha, Korai kizhangu	W	500-1000 [≈1350]	25-30

S.No	Botanical Name	Trade Name(s)	Major	Estimated Annual	Rate
80	<i>Cyperus scariosus</i>	<i>Nagarmotha</i>	W	200-500	25-30
81	<i>Datura metel</i>	<i>Duttura, Oomaththai, Umatham Dhattura</i>	W	200-500	50-70
82	<i>Decalepis hamiltonii</i>	<i>Magali</i>	TF	100-200	-
83	<i>Desmodium gangeticum</i>	<i>Salparni, Salaparni</i>	TF	500-1000	30-40
84	<i>Didymocarpus pedicellatus</i>	<i>Shilapushpi, Pasanphodi</i>	HF	100-200	
85	<i>Dioscorea bulbifera</i>	<i>Varahi kand, Varahi</i>	TF	200-500	40-45
86	<i>Eclipta prostrata</i>	<i>Bhringaraj, Karisaalai, Bhrngaraja</i>	W	2000-5000 [≈2480]	25-40
87	<i>Embelia ribes</i>	<i>Vaividang, Vavuvidan, Vidanga</i>	TF	100-200	450-550
88	<i>Embelia tsjeriam-cottam</i>	<i>Vaividang</i>	TF	500-1000	500-600
89	<i>Ephedra gerardiana</i>	<i>Somalatha</i>	HF	100-200	25-35
90	<i>Erythrina variegata</i>	<i>Murikkila, Paribhadra</i>	TF	100-200 [≈80]	-
91	<i>Eucalyptus globulus</i>	<i>Eucalyptus, Tailaparnah</i>	C	2000-5000	70-100
92	<i>Ferula assa-foetida</i>	<i>Hing, Hingu</i>	I	500-1000	12000
93	<i>Ficus benghalensis</i>	<i>Vadachhal, Nyagrodha</i>	TF	200-500 [≈340]	-
94	<i>Ficus religiosa</i>	<i>Lakh pipal, Arasu, Asvaha</i>	C	200-500 [≈1390]	150-250
95	<i>Flickingeria macraei*</i>	<i>Jivan</i>	TF	100-200	250-300
96	<i>Fumaria indica</i>	<i>Shahtara, Parpata, Piapapda</i>	W	200-500	20-Oct
97	<i>Garcinia gummi-gutta</i>	<i>Kokam, Kodampuli</i>	TF	2000-5000	200
98	<i>Garcinia indica</i>	<i>Kokam, Cambogie</i>	TF	100-200 [≈260]	50-65
99	<i>Gloriosa superba</i>	<i>Kalihari, Langali</i>	C	100-200	25-30
					200-500
100	<i>Glycyrrhiza glabra</i>	<i>Mulathi, Adhi Madhuarm, Yasti</i>	I	2000-5000	100-180
101	<i>Gmelina arborea</i>	<i>Ghambar chal, Gambhari</i>	TF	500-1000	35-40
102	<i>Gymnema sylvestre</i>	<i>Gudmar, Sarkarai kolli, Siru kurinjaan Mesarngi</i>	TF	500-1000	50-55
				[≈2750]	90-100
103	<i>Hedychium spicatum</i>	<i>Kapoor kachri, Sati</i>	HF	200-500	150-200
104	<i>Helicteres isora</i>	<i>Marodphali, Valampuri-Idampuri</i>	TF	100-200	20-30
105	<i>Hemidesmus indicus</i>	<i>Anatmool, Sveta sariva, Nannari, Maahaali</i>	TF	500-1000 [≈40]	290-300
106	<i>Hibiscus rosasinensis</i>	<i>Jashwan, Japa</i>	C	500-1000 [≈1950]	125-250
107	<i>Holarrhena pubescens</i>	<i>Inderjao, Indirayan Beej, Kutaja, Indrayava</i>	TF	500-1000 [≈55]	325-350
108	<i>Holoptelea integrifolia</i>	<i>Aavitholi, Cirabilva</i>	TF	100-200	
109	<i>Homalomena aromatica</i>	<i>Sugan mantri</i>	C	200-500 [≈45]	180-200
110	<i>Hygrophila schulli</i>	<i>Tal makhana, Kokilaksa</i>	W	200-500 [≈170]	250-300

S.No	Botanical Name	Trade Name(s)	Major	Estimated Annual	Rate
111	<i>Hyoscyamus niger</i>	<i>KhursaniAjwain, Parasikayavani</i>	HF	100-200	65-140
112	<i>Indigofera nctoria</i>	<i>Akika, Nili</i>	C	100-200	50-70
113	<i>Inula racemosa</i>	<i>Pushkarmool Puskara</i>	C	200-500	180-220
114	<i>Ipomoea mauritiana</i>	<i>Palmudhukkan Kshiravidari</i>	TF	200-500	35-50
115	<i>Ipomoea nil</i>	<i>Kaladana</i>	W	100-200	80-140
116	<i>Jasminum officinale</i>	<i>Ban chameli, Ja</i>	C	50-100	325-375
117	<i>Jasminum sambac</i>	<i>Mallika, Mogra</i>	C	100-200	325-375
118	<i>Juniperus communis</i>	<i>Hauber, Hapusa</i>	HF	100-200	80-100
119	<i>Justicia adhatoda</i>	<i>Adusa, Basu , Vasa</i>	C	2000-5000 [≈1975]	15-25
120	<i>Justicia beddomei</i>	<i>Vasa</i>	C	100-200	15-25
121	<i>Kaempferia galanga</i>	<i>Kachora, Kapoor, Kachri No 1</i>	C	100-200	115-220
122	<i>Lactuca sativa</i>	<i>Tukhm-Kahoo</i>	I	100-200	200-550
123	<i>Lawsonia inermis</i>	<i>Henna, Mehandi, Maruthondri Madayna</i>	C	2000-5000 [≈990]	45-75
124	<i>Lepidium sativum</i>	<i>Asaliya, Candrasura</i>	C	1000-2000	95-110
125	<i>Leptadenia reticulata</i>	<i>Paalai kodi, Jivan</i>	TF	200-500 [≈220]	100-400
126	<i>Litsea glutinosa</i>	<i>Maida chhal, Medasakah</i>	TF	500-1000	65-75
127	<i>Madhuca indica</i>	<i>Madhuka, Madhuka</i>	TF	200-500	75-100
128	<i>Madhuca longifolia</i>	<i>Mahua phool Iluppai</i>	TF	100-200	40-60
129	<i>Martynia annua</i>	<i>Kaknasa, Kakanasika</i>	W	100-200	60-100
130	<i>Melaleuca leucadendra</i>	<i>Cajuput</i>	I	100-200	-
131	<i>Melia azedarach</i>	<i>Bakain, Mahanimba</i>	C	100-200 [≈390]	20-Oct
132	<i>Mentha longifolia</i>	<i>Jangli Pudina,</i>	HF	100-200 [≈60]	20-85
133	<i>Mesua ferrea</i>	<i>Nagakesari, Nagkeshar</i>	TF	200-500	250-325
134	<i>Mimusops elengi</i>	<i>Bakul</i>	TF	200-500 [≈20]	40-50
135	<i>Morinda citrifolia</i>	<i>Canary wood, Noni</i>	C	500-1000	200-220
136	<i>Morinda coreia</i>	<i>Manjanatthi, Nunna</i>	TF	200-500 [≈295]	-
137	<i>Moringa oleifera</i>	<i>Sahenjana, Murungai, Sigrū</i>	C	500-1000 [≈8650]	400-500
138	<i>Mucunapru-riensvar. Utilis</i>	<i>Kavach beej, Kaunch beej, Atmagupta</i>	TF	500-1000 [≈30]	60-100
139	<i>Murraya koenigii</i>	<i>Kariveppila, Mitha Neem,</i>	C	200-500	25-35
		<i>Kari Patta, Karuvepilai, Saurabha-nimba</i>		[≈540]	
140	<i>Myristica fragrans</i>	<i>Jatipatre, Jaathikaai,</i>	C	200-500	475-550
		<i>Jaiphal, Javitri Ja phala</i>			850-950
141	<i>Nardostachys jatamansi</i>	<i>Balchad, Jatamansi</i>	HF	500-1000	850-900
142	<i>Nelumbo nucifera</i>	<i>Kamal phul, Kamalga, Kamala</i>	C	100-200	80-100
143	<i>Neopicrorhiza scrophulariiflora</i>	<i>Kutki</i>	HF	100-200	800-900
144	<i>Ocimum americanum</i>	<i>Bantulsi</i>	W	200-500 [≈95]	20-Oct

S.No	Botanical Name	Trade Name(s)	Major	Estimated Annual	Rate
145	Ocimum basilicum	Sweet basil, Kali tulsi, Tukmaria	C	200-500 [≈75]	120-225
146	Ocimum gratissimum	Vana tulasi, Tukmaria	C	1000-2000	90-110
147	Ocimum tenuiflorum	Tulsi, Tulasi	C	2000-5000 [≈30000]	50-75
148	Onosma bracteata	Gazbaan, Gojihva	I	100-200	240-270
149	Onosma hispida	Ratan jot	HF	100-200	225-250
150	Operculina turpethum	Nishoth, Shivadi, Trivrta	TF	500-1000 [≈120]	115-180
151	Oroxylum indicum	Tetuchaal, Syonaka	TF	500-1000 [≈310]	30-40
152	Paederia foetida	Prasaarani, Prasarini	TF	100-200 [≈510]	30-40
153	Parmelia perlata	Jhula, Chhadila, Dagarphool, Kalpaasi, Mehndi, Pathar ka Phool, Shilapushpa,	HF	500-1000	150-300
154	Pedaliium murex	Gokhru bada, Annai nerunji, Peru nerinjal	W	100-200 [≈160]	160-200
155	Peganum harmala	Harmal, Lal dana	W	100-200	60-80
156	Phyllanthus amarus	Bhumiamla, Keezhaa nelli, Tamalaki	W	1000-2000 [≈265]	30-40
157	Phyllanthus emblica	Amla, Nelli Amalaki	TF	>10000 [≈11980]	50-80
158	Phyllanthus maderaspatensis	Kanocha, Meeva nelli	W	1000-2000	-
159	Picrorhiza kurroa	Kutki, Katuka	HF	1000-2000	800-900
160	Pinus roxburghii	Gandabiroja, Sarala	HF	1000-2000	70-80
161	Piper chaba	Sheetal chini, Cubub, Kabab chini, Chavya	I	200-500	850-900
162	Piper longum	Pipal, Pippali, Pippalimula	C	1000-2000	625-850
				1000-2000	100-300
163	Pistacia integerrima	Kakarsinghi, Karkatasrangi	HF	200-500	800-1000
164	Plantago ovata	Isabgol	C	>30000	100-200
165	Pluchea lanceolata	Rasna	W	200-500	25-30
166	Plumbago indica	Chitrak, Rakta Citraka	C	100-200	90-150
167	Plumbago zeylanica	Chitrak, Kodiveli, Chitramulam Citraka	W	500-1000 [≈1345]	35-135
168	Polygonatum cirrhifolium	Salam Mishri, Meda, Mahameda	HF	100-200	250-350
169	Pongamia pinnata	Honge beej, Karanja	C	500-1000	35-45
170	Premna corymbosa	Munnai, Arni	TF	100-200	25-30
171	Premna serra folia	Arnimool, Agnimantha	TF	100-200	-
172	Prunus armeniaca	Chuli	C	100-200	-
173	Prunus cerasoides	Padamkasht, Padmaka	HF	100-200	75-85
174	Pseudarthria viscida	Moovila	W	200-500	-
175	Pterocarpus marsupium	Bijasal, Asana	TF	200-500 [≈1410]	30-40
176	Pterocarpus santalinus	Lal chandan, Raktachandana	TF	200-500	150-300
177	Pueraria tuberosa	Patal, Vidari Vidhari kanda	TF	500-1000	35-50
178	Punica granatum	Dadam, Dadima	HF	500-1000 [≈300]	450-500

S.No	Botanical Name	Trade Name(s)	Major	Estimated Annual	Rate
179	Quercus infectoria	<i>Majuphal, Mayakku</i>	I	100-200	475-550
180	Rauvolfia serpentina	<i>Pagal Buti, Sarpagandha</i>	TF	200-500 [≈25]	800-850
181	Rheum australe	<i>Revan chini, Dolu, Padamchal</i>	HF	100-200 [≈35]	100-250
182	Rhododendron arboreum	<i>Buras, GularrhPhool</i>	HF	100-200 [≈20]	250-280
183	Rubia cordifolia	<i>Majith, Manjistha</i>	TF	1000-2000	160-180
184	Salacia reticulata	<i>Pitila</i>	TF	100-200	550-650
185	Salix caprea	<i>Baid-mushk</i>	I	200-500	-
186	Santalum album	<i>Chandan, Sveta candana</i>	TF	500-1000	10000
187	Sapindus mukorossi	<i>Aretha mota, Reetha, Soapnut</i>	C	200-500 [≈115]	30-35
188	Saraca asoca	<i>Ashoka</i>	TF	1000-2000	65-150
189	Saussurea costus	<i>Kuth, Uplet, Kustha</i>	C	100-200	250-350
190	Scindapsus officinalis	<i>Gaj pipal Gajapippali</i>	TF	100-200	20-30
191	Semecarpus anacardium	<i>Balave, Bhallataka</i>	TF	200-500	15-20
192	Senna alexandrina	<i>Sona pa a, Svarnapatri</i>	C	>10000	80-125
193	Senna auriculata	<i>Avarai, Aavaarai</i>	W	500-1000	20-30
194	Senna occidentalis	<i>Kasondi, Kasmardah</i>	W	200-500	-
195	Senna tora	<i>Chakoda Beeja, Prapunnada</i>	W	>20000	45-55
196	Shorea robusta	<i>Raal, Sala</i>	TF	100-200	50-70
					215-350
197	Sida acuta	<i>Bala</i>	W	100-200	20-Oct
198	Sida cordifolia	<i>Bala, Beej Bandh, Khare</i>	W	1000-2000	20-Oct
199	Sida rhombifolia	<i>Bala, Mahabala</i>	W	1000-2000	20-Oct
200	Smilax china	<i>Chobchini, Madhusnuhi</i>	I	100-200	300-600
201	Solanum anguivi	<i>Katheli badi, Brha</i>	W	500-1000 [≈130]	70-80
202	Solanum nigrum	<i>Makoi, Kakamaci</i>	W	2000-5000	110-120
				100-200 [≈1685]	20-25
203	Solanum virginianum	<i>Kateli, Kantakari</i>	W	500-1000 [≈295]	30-35
204	Spermocoe hispida	<i>Thaarthaaval</i>	W	100-200	-
205	Sphaeranthus indicus	<i>Gorakmundi, Mundi ka</i>	W	200-500	30-40
206	Stereospermum chelonoides	<i>Patala, Padal fali, Patalai</i>	T	500-1000	16-20
207	Stereospermum-tetragonum	<i>Patala, Patalai</i>	TF	200-500	-
208	Strobilanthes ciliata	<i>Kurinji, Sahchara</i>	TF	200-500	-
209	Strychnos nux-vomica	<i>Kuchla, Nirmali, Visamus</i>	TF	500-1000	55-75
210	Strychnos potatorum	<i>Nirmali, Thaethaan, Kataka</i>	TF	100-200	120-140
211	Swertia chirayita	<i>Chiraiyata, Kirata kta</i>	HF	500-1000 [≈145]	300-325
212	Symplocos cochinchinensis	<i>Lodhra</i>	TF	100-200	45-55
213	Symplocos racemosa	<i>Pathani lodh, Lodhra</i>	TF	500-1000	45-55

S.No	Botanical Name	Trade Name(s)	Major	Estimated Annual	Rate
214	<i>Syzygium cumini</i>	<i>Jamun, Jambu</i>	C	500-1000 [≈860]	30-40
215	<i>Tamarix gallica</i>	<i>Manna Plant, Jhav, French Tamarisk</i>	I	100-200	-
216	<i>Tamarix indica</i>	<i>Jhan</i>	W	100-200	-
217	<i>Tanacetum cinerariifolium</i>	<i>Pyrethrum</i>	C	200-500	-
218	<i>Taxus wallichiana</i>	<i>Talispatra, Sthauneya</i>	HF	100-200	45-50
219	<i>Tecomella undulata</i>	<i>Rohida, Rohitaka</i>	TF	100-200	-
220	<i>Tephrosia purpurea</i>	<i>Sarad foka, Sarpankha, Kozhinji, Surphanka</i>	W	200-500	20-Oct
221	<i>Teramnus labialis</i>	<i>Masaparni</i>	W	100-200	40-50
222	<i>Terminalia arjuna</i>	<i>Arjun, Arjuna</i>	TF	2000-5000 [≈2750]	20-25
223	<i>Terminalia bellirica</i>	<i>Behdea, Bibhitaka</i>	TF	2000-5000 [≈5780]	30-Oct
224	<i>Terminalia chebula</i>	<i>Harda, Haritaki</i>	TF	5000-10000 [≈5740]	15-30
225	<i>Tinospora cordifolia</i>	<i>Giloy, Amruthvalli, Seendhil Guduci</i>	W	1000-2000 [≈2330]	35-40
226	<i>Tinospora sinensis</i>	<i>Amrata, Giloy</i>	W	1000-2000	35-40
227	<i>Tragia involucrata</i>	<i>Barhanta, Vrscikalli</i>	W	200-500	-
228	<i>Trianthena decandra</i>	<i>Saarana ver,</i>	W	100-200 [≈55]	-
229	<i>Tribulus lanuginosus</i>	<i>Gokhru, Seru nerunjil</i>	W	200-500	100-120
230	<i>Tribulus terrestris</i>	<i>Gokhru, Gokshura</i>	W	2000-5000 [≈80]	100-120
231	<i>Trichosanthes cucumerina</i>	<i>Patol panchang</i>	W	100-200	35-40
232	<i>Trillidium govanianum</i>	<i>Nag Chhatri, Satva</i>	HF	200-500	2000-2500
233	<i>Uraria picta</i>	<i>Prshniparni, Prsniparni</i>	C	200-500	
234	<i>Valeriana jatamansi</i>	<i>Musakbala, Tagar ganth, Sugandhbala,</i>	HF	1000-2000	370-425
235	<i>Viola pilosa</i>	<i>Banafasha</i>	HF	100-200	850-1200
236	<i>Vitex negundo</i>	<i>Neergundi, Nirgundi, Renuka</i>	C	500-1000 [≈760]	25-30
237	<i>Withania somnifera</i>	<i>Ashwagandha, Amukkuraa, Asvagandha</i>	C	2000-5000 [≈20]	225-350
238	<i>Woodfordia fruticosa</i>	<i>Dhaiphool, Thaathiri Dhataki</i>	TF	2000-5000	60-70
239	<i>Wrightia tinctoria</i>	<i>Indrajau</i>	TF	200-500	60-65
240	<i>Zanthoxylum armatum</i>	<i>Tejbal, Timur Tejova</i>	HF	200-500 [≈220]	100-200
241	<i>Zingiber zerumbet</i>	<i>Narkachur</i>	C	1000-2000	38-40
242	<i>Ziziphus mauritiana</i>	<i>Ber, Kola</i>	TF	200-500 [≈40]	15-25

2. Key role of FRLHT – TDU in the recent history of Indian initiatives for insitu conservation of medicinal flora

The first comprehensive program for *insitu* conservation of medicinal plants in the country began in 1993 under a bilateral cooperation program between MoEF GoI and DANIDA.

FRLHT (Foundation for Revitalization of Local Health Traditions, Bangalore) recently legislated into the “Trans-Disciplinary University”, was the national technical coordinator of the medicinal plant conservation program. The execution of the program was undertaken by State Forest Departments (SFD) of Kerala, Karnataka and Tamil Nadu. During 1993-2004, 34 Medicinal Plant Conservation Areas (MPCAs) were established across different forest types to conserve wild populations of medicinal species. Subsequently 74 more MPCAs were established in 9 other states

(Maharashtra, Andhra Pradesh, Madhya Pradesh, Orissa, West Bengal, Rajasthan, Arunachal Pradesh, Uttarakhand and Chhattisgarh) under UNDP supported CCF I (Country Coordination Fund), CCF II and Global Environment Facility (GEF). Altogether 108 MPCAs across 12 States were established during 1993-2014. Additionally, during 2008-2018 the National Medicinal Plants Board (NMPB) has independently established 102 MPCAs. Today the size of India's MPCA network has grown to over 210 sites. Each MPCA is of an average size of 200 Ha, and they are distributed across 21 States of India. This is the largest *insitu* conservation network for conserving wild gene pools of medicinal plants in the tropical world. However, it is hardly known to conservationists and even at times to policy makers that India is a global leader in *insitu* conservation of medicinal plants.

In hindsight, on review of the MPCA's program in 2019, despite its size, the program in India has serious limitations, which if corrected can result over the ensuing decade in the creation of a globally significant conservation effort for medicinal botanicals that can benefit not only India, but countries all over the world.

3. In 2019: TDU working on a plan to build upon the conservation initiatives of the last two decades

There are 6581 species of medicinal botanicals documented in India. The actual number may in fact be much higher of the order of 10,000 species, but due to limited ethno medical studies across the length and breadth of India, the current documentation is of the order, as mentioned above. Obviously one needs to prioritize species for *insitu* conservation. Reflection on the matter would suggest that the priority should be on species that are in high volume trade and actual use and alongside key parameters like their endemism and current population status. It is also important to appreciate that the practical execution of a national program for *insitu* conservation of wild gene pools of medicinal botanicals can only be *done at State levels* with the active involvement of State Forest Departments. Thus the scientific execution of a contemporary, world class Medicinal Plant Conservation Program needs four kinds of prior information.



Nursery at TDU

Firstly, knowledge about which are the medicinal species in high volume all India trade and of species that are largely sourced from wild forest habitats. This information is available today in the Trans-Disciplinary University from the work of the last two decades.

Secondly, it is necessary to analyze traded species that are endemics or assessed to be under higher degrees of threat as per IUCN criteria. This information is partially available today and more analytical and field work needs to be done to bring to the table rigorously determined information.

The third requirement is ready access to a database on the occurrence of the medicinal flora in all the 29 States and 7 union territories in India. This information is partially available and needs to be deepened.

Fourthly, it is essential to have reliable information on the natural geographical distribution of the highly traded endemic and threatened species. This information is largely available but incomplete in the geographical distribution databases established over the last two decades by the Trans-Disciplinary University. Ideally the distribution of medicinal species should be determined not only at State levels but also at taluka levels for meaningful applications of the knowledge of medicinal botanicals, particularly in the context of health and livelihood security.

It is based on the above four kinds of information at State level that forest managers and policy makers can deepen the efforts of the last two decades by focusing on highly traded, endemic and threatened medicinal taxa that are State specific.

3.1. Need for revisiting the MPCA program to 1993-2015

The already established 210 MPCAs were created during 1993-2015 across 21 States. Today they definitely need to be revisited to analyze how many of them are appropriate sites in the light of information available in 2019 which was not available in 1993-2015. In 1993 there was not even a comprehensive check list of the medicinal plants of India and no information on the 242 botanicals known today to be in high volume trade, several of which are endemics and threatened. The early MPCAs were therefore established in vegetation types and sites selected only

on the criteria of capturing species diversity. However today MPCA sites have to be very carefully selected by State Forest Departments to capture gene pools of the breeding populations of highly traded endemics and threatened medicinal plants that occur in the particular State. In most of the 21 States the MPCA program is dormant. Some MPCAs may indeed harbor populations and gene pools of one or more of the priority 242 species, others may merely have populations of medicinal species, but they may not be significant sites in respect to carrying viable breeding populations of the priority species for *insitu* conservation.

Further refinement of the MPCA program will subsequently happen when State Forest Departments support genetic studies to select specific MPCA sites rich in gene pools of highly traded endemics and threatened species, including studies to determine the number of MPCAs needed for a particular medicinal species to conserve its hot spots of intra-specific genetic diversity across its geographical distribution range. For example, in the case of an endangered and threatened species like *Saraca ashoka*, which is distributed from pockets in Kerala, TN, Karnataka, Maharashtra, Goa, Orissa, Meghalaya, Assam and Manipur, the gene pool cannot be captured in one MPCA site because of its genetic diversity. However, in the case of an endemic species like *Pterocarpus santalinus*, which is endemic to Tirupati,

Nellore, Kuddapa and Kurnool in AP, one MPCA site may suffice. A further quantum jump to the program will take place when genetic material of therapeutic value from MPCAs is made available to breeders for *ex-situ* multiplication. It is also important to put in place sustainable Joint Forest Management (JFM) programs around MPCA sites to ensure community benefits from the conservation program.

Red Listed (Near threatened and above) medicinal plants list prepared by FRLHT

(Based on IUCN Red List Categories and Criteria)

S.No	Botanical names	Status
1	<i>Abelmoschus moschatus</i> Medik.	NT
2	<i>Abies densa</i> W.Griff. ex Parker	NT
3	<i>Abrus precatorius</i> L.	NT
4	<i>Aconitum balfourii</i> Stapf	VU
5	<i>Aconitum bisma</i> (Buch.-Ham.) Rapaics	EN
6	<i>Aconitum chasmanthum</i> Stapf ex Holmes	CR
7	<i>Aconitum deinorrhizum</i> Stapf	EN
8	<i>Aconitum ferox</i> Wall. ex Seringe	EN



MPCA established in Uttarakhand

S.No	Botanical names	Status
9	<i>Aconitum heterophyllum</i> Wall. ex Royle	CR
10	<i>Aconitum spicatum</i> (Bruhl) Stapf	EN
11	<i>Aconitum violaceum</i> Jacq. ex Stapf	VU
12	<i>Acorus calamus</i> L.	EN
13	<i>Adenia hondala</i> (Gaertn.) W.J.de Wilde	VU
14	<i>Adhatoda beddomei</i> C. B. Clarke	CR
15	<i>Aegle marmelos</i> (L.) Corr.	VU
16	<i>Alectra chitrakutensis</i> (Rau) Prasad & Dixit	CR
17	<i>Allium stracheyi</i> Baker	VU
18	<i>Alpinia calcarata</i> Roscoe	EN
19	<i>Amentotaxus assamica</i> D.K.Ferguson	CR
20	<i>Amorphophallus commutatus</i> (Schott) Engl.	VU
21	<i>Amorphophallus paeoniifolius</i> (Dennst.) Nicolson	VU
22	<i>Amorphophallus sylvaticus</i> (Roxb.) Kunth	VU
23	<i>Ampelocissus araneosa</i> (Dalz. & Gibson) Planch.	VU
24	<i>Ampelocissus barbata</i> (Wall.) Planch.	EN
25	<i>Ampelocissus indica</i> (L.) Planch.	EN
26	<i>Andrographis paniculata</i> (Burm.f.) Wall. ex Nees	VU
27	<i>Angelica glauca</i> Edgew.	EN
28	<i>Angiopteris evecta</i> (Forst.) Hoffm.	EN
29	<i>Anodendron paniculatum</i> A.DC.	EN
30	<i>Aphanamixis polystachya</i> (Wall.) Parker	VU
31	<i>Aquilaria malaccensis</i> Lam.	CR
32	<i>Arisaema tortuosum</i> Schott	VU
33	<i>Aristolochia indica</i> L.	NT



Asoka tree (*Saraka ashoka*)

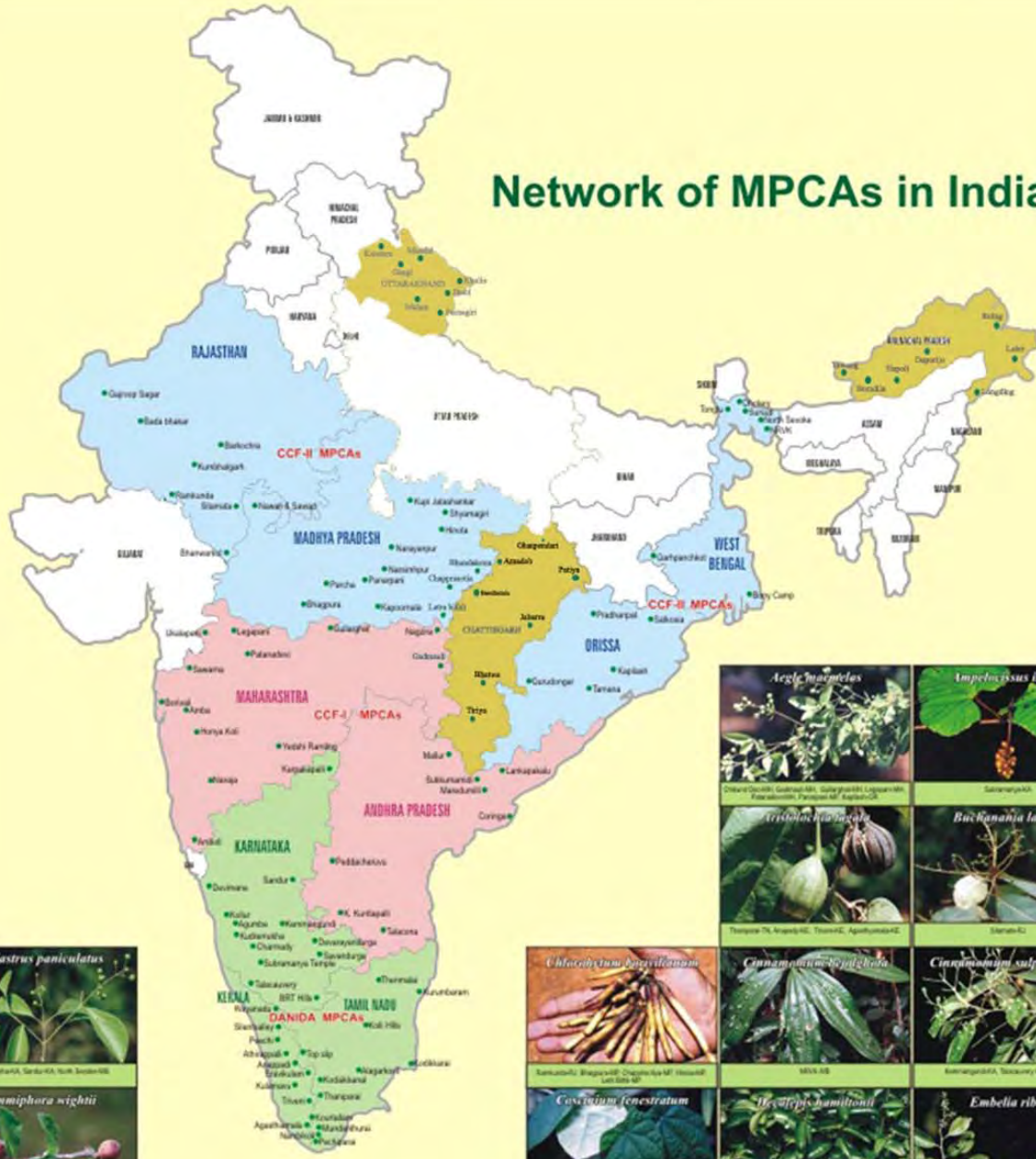


Red Sandalwood (*Pterocarpus santalinus*)

S.No	Botanical names	Status
34	<i>Aristolochia tagala</i> Cham	VU
35	<i>Arnebia benthami</i> (Wall. ex G.Don) Johns	CR
36	<i>Arnebia euchroma</i> (Royle) John.	CR
37	<i>Artemisia maritima</i> L.	VU
38	<i>Artocarpus hirsutus</i> Lam.	VU
39	<i>Asparagus racemosus</i> Willd.	EN
40	<i>Asparagus rottleri</i> Baker	EX
41	<i>Atropa acuminata</i> Royle ex Lindl.	CR
42	<i>Balanophora involucreta</i> Hook.f.	EN
43	<i>Baliospermum montanum</i> (Willd.) Mull.Arg.	VU
44	<i>Barleria acanthoides</i>	VU
45	<i>Berberis aristata</i> DC.	VU
46	<i>Bergenia ciliata</i> (Haw.) Sternb.	VU
47	<i>Bergenia stracheyi</i> (Hook.f. & Thoms.) Engl.	VU
48	<i>Betula utilis</i> D.Don	CR
49	<i>Blepharis sindica</i> Stocks ex T.Anders	VU
50	<i>Blepharispermum subsessile</i> DC.	EN
51	<i>Boswellia ovalifoliolata</i> Bal. & Henry	EN
52	<i>Boswellia serrata</i> Roxb. ex Colebr.	EN
53	<i>Brucea mollis</i> Wall. ex Kurz	EN
54	<i>Buchanania lanzan</i> Spreng.	VU
55	<i>Bunium persicum</i> (Boiss.) Fedts.	EN
56	<i>Butea monosperma</i> var. <i>lutea</i> (Witt.) Maheshwari	EN
57	<i>Cadaba fruticosa</i> (L.) Druce	NT
58	<i>Caesalpinia digyna</i> Rottler	VU
59	<i>Calligonum polygonoides</i> L.	EN

S.No	Botanical names	Status
60	<i>Calophyllum apetalum</i> Willd.	VU
61	<i>Canarium strictum</i> Roxb.	VU
62	<i>Capparis moonii</i> Wight	NT
63	<i>Cayratia pedata</i> (Lam.) Juss. ex Gagnep. var. <i>glabra</i> Gamble	EN
64	<i>Celastrus paniculatus</i> Willd.	EN
65	<i>Cephalotaxus griffithii</i> Hook.f.	EN
66	<i>Cerbera odollam</i> Gaertn.	VU
67	<i>Ceropegia bulbosa</i> Roxb.	VU
68	<i>Chlorophytum arundinaceum</i> Baker	EN
69	<i>Chlorophytum borivillianum</i> Sant. & Fernandes	CR
70	<i>Chlorophytum tuberosum</i> Baker	VU
71	<i>Chonemorpha fragrans</i> (Moon) Alston	EN
72	<i>Cibotium barometz</i> Link.	EN
73	<i>Cinnamomum bejolghota</i> (Buch.-Ham.) Sweet	VU
74	<i>Cinnamomum cecidodaphne</i> Meissn.	EN
75	<i>Cinnamomum macrocarpum</i> Hook.f.	VU
76	<i>Cinnamomum sulphuratum</i> Nees	VU
77	<i>Cinnamomum tamala</i> (Buch.-Ham.) Nees	VU
78	<i>Cinnamomum wightii</i> Meisn.	EN
79	<i>Citrullus colocynthis</i> (L.) Kuntze	VU
80	<i>Citrus macroptera</i> Montr. var. <i>annamensis</i> Tanaka	EN
81	<i>Clerodendrum serratum</i> (L.) Moon	EN
82	<i>Cochlospermum religiosum</i> DC.	CR
83	<i>Colchicum luteum</i> Baker	VU

Network of MPCAs in India



S.No	Botanical names	Status
84	<i>Commiphora wightii</i> (Arn.) Bhandari	CR
85	<i>Coptis teeta</i> Wall.	EN
86	<i>Cordia macleodii</i> (Griff.) Hook.f. & Thoms.	EN
87	<i>Corollacarpus epigaeus</i> (Rottler & Willd.) Clarke	EN
88	<i>Coscinium fenestratum</i> (Gaertn.) Coleb.	CR
89	<i>Costus speciosus</i> (J.Koenig ex Retz.) Sm.	VU
90	<i>Crateva magna</i> (Lour.) DC.	VU
91	<i>Curcuma angustifolia</i> Roxb.	VU
92	<i>Curcuma pseudomontana</i> Graham	VU
93	<i>Curcuma zedoaria</i> (Christ.) Roscoe	VU
94	<i>Cycas beddomei</i> Dyer	CR
95	<i>Cycas circinalis</i> L.	CR
96	<i>Dactylorhiza hatagirea</i> (D.Don) Soo	CR
97	<i>Datisca cannabina</i> L.	EN
98	<i>Decalepis hamiltonii</i> Wight & Arn.	EN
99	<i>Dendrobium nobile</i> Lindl.	EN
100	<i>Desmodium motorium</i> (Houtt.) Merr.	VU
101	<i>Didymocarpus pedicillata</i> R. Br.	EN
102	<i>Dioscorea bulbifera</i> L.	VU
103	<i>Dioscorea deltoidea</i> Wall. ex Griseli	EN
104	<i>Dioscorea hispida</i> Dennst.	VU
105	<i>Dioscorea prazeri</i> Prain & Burkill	EN
106	<i>Diospyros candolleana</i> Wight	VU
107	<i>Diospyros paniculata</i> Dalz.	VU
108	<i>Dipcadi ursulae</i> Blatter	EN
109	<i>Dipterocarpus indicus</i> Bedd.	EN
110	<i>Drosera burmannii</i> Vahl	EN
111	<i>Drosera indica</i> L.	EN
112	<i>Drosera peltata</i> J.E.Sm. ex Willd.	EN
113	<i>Dysoxylum malabaricum</i> Bedd. ex Hiern	EN
114	<i>Elaeocarpus sphaericus</i> (Gaertn.) K.Schum.	VU
115	<i>Embelia ribes</i> Burm.f.	CR
116	<i>Embelia tsjeriam-cottam</i> (Roem. & Schult.) A. DC.	VU
117	<i>Entada pursaetha</i> DC.	EN
118	<i>Ephedra foliata</i>	EN

S.No	Botanical names	Status
119	<i>Ephedra gerardiana</i> Wall. ex Stapf.	EN
120	<i>Eremostachys superba</i> Royle ex Benth.	VU
121	<i>Eulophia cullenii</i> (Wight) Blume	CR
122	<i>Eulophia herbacea</i> Lindl.	EN
123	<i>Eulophia nuda</i> Lindl.	EN
124	<i>Eulophia ochreatea</i>	CR
125	<i>Eulophia ramentacea</i> Wight	EN
126	<i>Euphorbia fusiformis</i> Buch.-Ham.	VU
127	<i>Fagonia cretia</i> L.	VU
128	<i>Ferula jaeschkeana</i> Vatke	VU
129	<i>Flickingeria fugax</i> (Rchb.f.) Seodemf.	EN
130	<i>Fritillaria cirrhosa</i> D.Don	EN
131	<i>Fritillaria roylei</i> Hook.	EN
132	<i>Fumaria indica</i> Pugsley	EN
133	<i>Garcinia gummi-gutta</i> (L.) Robson	NT
134	<i>Garcinia indica</i> (Thouars) Choisy	VU
135	<i>Garcinia morella</i> (Gaertn.) Desr.	VU
136	<i>Garcinia pedunculata</i> Roxb.	EN
137	<i>Garcinia travancorica</i> Bedd.	EN
138	<i>Garcinia xanthochymus</i> Hook.f.	VU
139	<i>Gardenia gummifera</i> L.f.	VU
140	<i>Gardenia resinifera</i> Roth	NT
141	<i>Gentiana kurroo</i> Royle	CR
142	<i>Gentiana quadrifaria</i> Bl.	VU
143	<i>Gloriosa superba</i> L.	EN
144	<i>Glycosmis macrocarpa</i> Wight	VU
145	<i>Gnetum ula</i> Brongn.	VU
146	<i>Gymnadenia orchides</i> Lindl.	VU
147	<i>Gymnema khandalense</i> Santapau	EN
148	<i>Gymnema montanum</i> (Roxb.) Hook.f.	EN
149	<i>Gymnema sylvestre</i> R.Br.	EN
150	<i>Gymnocladus assamicus</i> Kanjilal	CR
151	<i>Gynocardia odorata</i> R.Br.	EN
152	<i>Habenaria intermedia</i> D.Don	EN
153	<i>Hedychium coronarium</i> Koenig	VU
154	<i>Heliotropium keralense</i> Sivar. & Manilal	CR
155	<i>Helminthostachys zeylanica</i> (L.) Hook.	CR

S.No	Botanical names	Status
156	<i>Heracleum candolleianum</i> (Wight & Arn.) Gamble	VU
157	<i>Heracleum lanatum</i> Michx.	VU
158	<i>Hildegardia populifolia</i> (Roxb.) Schott & Endl.	VU
159	<i>Hippophae rhamnoides</i> L.	VU
160	<i>Hippophae salicifolia</i> D.Don	NT
161	<i>Holostemma ada-kodien</i> Schult.	CR
162	<i>Homalomena aromatica</i> (Roxb.) Schott	EN
163	<i>Humboldtia vahliana</i> Wight	EN
164	<i>Hydnocarpus alpina</i> Wight	VU
165	<i>Hydnocarpus kurzii</i> (King.) Warb.	VU
166	<i>Hydnocarpus macrocarpa</i> (Bedd.) Warb.	EN
167	<i>Hydnocarpus pentandra</i> (Buch.-Ham.) Oken	VU
168	<i>Hyoscyamus niger</i> L.	EN
169	<i>Hypericum perforatum</i> L.	VU
170	<i>Hyssopus officinalis</i> L.	VU
171	<i>Illicium griffithii</i> Hook.f. & Thoms.	CR
172	<i>Iphigenia stellata</i> Blatter	EN
173	<i>Ipomoea mauritiana</i> Jacq.	NT
174	<i>Janakia arayalpathra</i> J. Joseph & V. Chandras.	CR
175	<i>Juniperus polycarpos</i> C. Koch.	EN
176	<i>Jurinea dolomiaea</i> Boiss.	EN
177	<i>Kingiodendron pinnatum</i> (Roxb. ex DC.) Harms	VU
178	<i>Knema attenuata</i> (Hook.f. & Thoms.) Warb.	NT
179	<i>Lamprachaenium microcephalum</i> Benth.	EN
180	<i>Lasia spinosa</i> (L.) Thw.	EN
181	<i>Leptadenia reticulata</i> Wt. & Arn.	EN
182	<i>Lilium polyphyllum</i> D.Don ex Royle	CR
183	<i>Limonia acidissima</i> L.	VU
184	<i>Litsea glutinosa</i> (Lour.) Robinson	CR
185	<i>Luffa echinata</i> Roxb.	EN
186	<i>Lumnitzera racemosa</i> Willd.	VU
187	<i>Lycopodiella cernua</i> (L.) Pichi-Sermolli	EN
188	<i>Madhuca insignis</i> (Radlk.) H.J.Lam.	EX
189	<i>Madhuca longifolia</i> (Koen.) Macbr.	VU
190	<i>Madhuca neriifolia</i> (Moon) H.J.Lam	VU

S.No	Botanical names	Status
191	<i>Mahonia napaulensis</i> DC.	VU
192	<i>Malaxis muscifera</i> (Lindl.) Kuntze	CR
193	<i>Manilkara hexandra</i> (Roxb.) Dubard	EN
194	<i>Meconopsis aculeata</i> Royle	EN
195	<i>Mesua ferrea</i> L.	EN
196	<i>Michelia champaca</i> L.	EN
197	<i>Michelia nilagirica</i> Zenk.	VU
198	<i>Morinda citrifolia</i> L.	VU
199	<i>Moringa concanensis</i> Nimmo ex Dalz. & Gibson	VU
200	<i>Mucuna monosperma</i> DC.	VU
201	<i>Mucuna pruriens</i> (L.) DC.	EN
202	<i>Mucuna gigantea</i> (Willd.) DC.	EN
203	<i>Myristica dactyloides</i> Gaertn.	VU
204	<i>Myristica malabarica</i> Lam.	VU
205	<i>Nardostachys grandiflora</i> DC.	CR
206	<i>Naringi crenulata</i> (Roxb.) Nicolson	VU
207	<i>Nepenthes khasiana</i> Hook.f.	EN
208	<i>Nervilia aragoana</i> Gaud.	EN
209	<i>Nervilia prainiana</i> (King & Prantl) Scidenf.	NT
210	<i>Neurada procumbens</i> L.	EN
211	<i>Nilgiranthus ciliatus</i> (Nees) Bremek.	EN
212	<i>Nothapodytes nimmoniana</i> (Graham) Mabber.	EN
213	<i>Nypa fruticans</i> (Thunb.) Wurmb.	VU
214	<i>Ochreinauclea missionis</i> (Wall. ex G. Don) Ridsdale	VU
215	<i>Ocimum gratissimum</i> L.	VU
216	<i>Olax nana</i> Wall.	VU
217	<i>Operculina turpethum</i> (L.) Silva Manso = <i>Merremia turpethum</i> (L.) Shah & Bhat	EN
218	<i>Ophioglossum reticulatum</i> L.	EN
219	<i>Oroxylum indicum</i> (L.) Vent.	EN
220	<i>Ougeinia oojeinensis</i> (Roxb.) Hochr.	EN
221	<i>Paederia foetida</i> L.	VU
222	<i>Panax pseudoginseng</i> Wall.	CR
223	<i>Panax wangianus</i> Sun	EN
224	<i>Paphiopedilum druryi</i> (Bedd.) Pfitz.	CR
225	<i>Paris polyphylla</i> Sm.	EN



Herbarium and Raw Drug Repository of Medicinal Botanicals in TDU

S.No	Botanical names	Status
226	<i>Peganum harmala</i> L.	VU
227	<i>Pericampylus glaucus</i> (Lam.) Merr.	VU
228	<i>Persea glaucescens</i> (Nees) Long	CR
229	<i>Persea macrantha</i> (Nees) Kosterm.	EN
230	<i>Peucedanum nagpurensis</i> (C.B. Clarke) Prain	VU
231	<i>Phyllanthus emblica</i> L.	VU
232	<i>Phyllanthus indofischeri</i> Benn.	VU
233	<i>Physochlaena praealta</i> (Walp.) Miers.	VU
234	<i>Picrorhiza kurroa</i> Royle ex Benth.	CR
235	<i>Pimpinella tirupatiensis</i> Bal. & Subr.	EN
236	<i>Piper barberi</i> Gamble	CR
237	<i>Piper betleoides</i> C. DC.	NT
238	<i>Piper boehmeriaefolium</i> Wall. ex C. DC.	VU
239	<i>Piper longum</i> L.	EN
240	<i>Piper mullesua</i> Buch.-Ham. ex D. Don	VU
241	<i>Piper nigrum</i> L.	EN
242	<i>Piper pedicellatum</i> C. DC.	VU
243	<i>Piper peepuloides</i> Roxb.	VU
244	<i>Plectranthus barbatus</i> Andr.	EN
245	<i>Plectranthus nilgherricus</i> Benth.	EN
246	<i>Pleione maculata</i> (Lindl.) Lindl. & Paxton	EN
247	<i>Pluchea lanceolata</i> Oliver & Hiern.	NT
248	<i>Plumbago indica</i> L.	EN
249	<i>Plumbago zeylanica</i> L.	VU
250	<i>Podophyllum hexandrum</i> Royle	CR
251	<i>Polyalthia simiarum</i> (Buch.-Ham.) Hook. f. & Thoms.	VU

S.No	Botanical names	Status
252	<i>Polygonatum cirrhifolium</i> (Wall.) Royle	EN
253	<i>Polygonatum multiflorum</i> (L.) All.	VU
254	<i>Polygonatum verticillatum</i> (L.) All.	VU
255	<i>Pseudarthria viscida</i> (L.) Wight & Arn.	VU
256	<i>Psilotum nudum</i> (L.) P. Beauv.	CR
257	<i>Pterocarpus marsupium</i> Roxb.	CR
258	<i>Pterocarpus santalinus</i> L. f.	CR
259	<i>Pueraria tuberosa</i> (Roxb. ex Willd.) DC.	CR
260	<i>Rauwolfia serpentina</i> (L.) Benth. ex Kurz	CR
261	<i>Rhaphidophora decursiva</i> (Roxb.) Sch.	EN
262	<i>Rhaphidophora pertusa</i> (Roxb.) Schott	VU
263	<i>Rheum emodi</i> Wall. ex Meissn.	EN
264	<i>Rheum moorcroftianum</i> Royle	EN
265	<i>Rheum nobile</i> Hook. f. & Thoms.	VU
266	<i>Rheum spiciforme</i> Royle	VU
267	<i>Rheum webbianum</i> Royle	VU
268	<i>Rhodiola heterodonta</i> (Hook. f. & Thoms.) Boriss	VU
269	<i>Rhododendron anthopogon</i> D. Don	EN
270	<i>Rhododendron campanulatum</i> D. Don	VU
271	<i>Rhododendron lepidotum</i> Wall. ex D. Don	VU
272	<i>Roylea cinerea</i> (D. Don) Baillon	VU
273	<i>Rubia cordifolia</i> L.	VU
274	<i>Salacia oblonga</i> Wall. ex Wight & Arn.	VU
275	<i>Salacia reticulata</i> Wight	EN
276	<i>Salvadora oleoides</i> Decne	VU

S.No	Botanical names	Status
277	<i>Salvadora persica</i> L.	VU
278	<i>Santalum album</i> L.	EN
279	<i>Saraca asoca</i> (Roxb.) W.J. de Wilde	CR
280	<i>Sarcostemma viminale</i> (L.) R.Br.	VU
281	<i>Saussurea costus</i> (Falc.) Lipsch.	CR
282	<i>Saussurea gossypiphora</i> D.Don	CR
283	<i>Saussurea obvallata</i> (DC.) Edgew.	CR
284	<i>Schrebera swietenoides</i> Roxb.	VU
285	<i>Scindapsus officinalis</i> (Roxb.) Schott	VU
286	<i>Semecarpus travancorica</i> Bedd.	EN
287	<i>Shorea robusta</i> Roxb. ex Gaertn.f.	NT
288	<i>Shorea tumbaggaia</i> Roxb.	CR
289	<i>Smilax zeylanica</i> L.	VU
290	<i>Smilax glabra</i> Roxb.	CR
291	<i>Sonneratia caseolaris</i> (L.) Engl.	EN
292	<i>Stemona tuberosa</i> Lour.	VU
293	<i>Sterculia urens</i> Roxb.	EN
294	<i>Stereospermum chelonoides</i> (L.f.) DC.	NT
295	<i>Stereospermum colais</i> (Dillwyn) Mabb.	EN
296	<i>Strychnos aenea</i> A.W.Hill	EN
297	<i>Strychnos colubrina</i> L.	EN
298	<i>Strychnos nux-vomica</i> L.	VU
299	<i>Strychnos potatorum</i> L.f.	VU
300	<i>Swertia chirayita</i> (Roxb. ex Flem.) Karst.	CR
301	<i>Swertia corymbosa</i> (Griseb.) Wight ex C.B.Clarke	VU
302	<i>Swertia lawii</i> (Wight ex C.B.Clarke) Burkill	EN
303	<i>Symplocos paniculata</i> (Thunb.) Miq.	VU
304	<i>Symplocos racemosa</i> Roxb.	CR
305	<i>Syzygium alternifolium</i> (Wight) Walp.	EN
306	<i>Syzygium travancoricum</i> Gamble	EN
307	<i>Tacca integrifolia</i> Ker-Gawl.	EN
308	<i>Tacca leontopetaloides</i> (L.) Kuntze	NT
309	<i>Taxus wallichiana</i> Zucc.	CR
310	<i>Tecomella undulata</i> (Sm.) Seem.	EN
311	<i>Terminalia arjuna</i> (Roxb. ex DC.) Wight & Arn.	VU
312	<i>Terminalia chebula</i> Retz.	VU

S.No	Botanical names	Status
313	<i>Terminalia pallida</i> Brandis	EN
314	<i>Thalictrum dalzellii</i> Hook.	EN
315	<i>Thalictrum foliolosum</i> DC.	VU
316	<i>Tinospora sinensis</i> (Lour.) Merr.	VU
317	<i>Toona ciliata</i> M.J.Roem.	VU
318	<i>Tragia bicolor</i> Miq.	VU
319	<i>Tribulus rajasthanensis</i> Bhandari & Sharma	CR
320	<i>Trichopus zeylanicus</i> Gaertn. subsp. <i>travancoricus</i> (Bedd.) Burkill	EN
321	<i>Trichosanthes cucumerina</i> L.	NT
322	<i>Tropidia curculigoides</i> Lindl.	EN
323	<i>Tylophora indica</i> (Burm.f.) Merr.	VU
324	<i>Uraria picta</i> (Jacq.) Desv. ex DC.	VU
325	<i>Urginea indica</i> (Roxb.) Kunth	VU
326	<i>Urginea nagarjunae</i> Hemadri & Swahari	EN
327	<i>Utleria salicifolia</i> Bedd.	CR
328	<i>Valeriana hardwickii</i> Wall.	VU
329	<i>Valeriana jatamansi</i> Jones	VU
330	<i>Valeriana leschenaultii</i> DC.	CR
331	<i>Vateria indica</i> L.	VU
332	<i>Vateria macrocarpa</i> B.L. Gupta	CR
333	<i>Xylocarpus granatum</i> Koenig	EN
334	<i>Zanthoxylum armatum</i> DC.	EN
335	<i>Zanthoxylum rhetsa</i> (Roxb.) DC.	EN

4. The rich Indian knowledge base of medicinal botanicals and its resonance with the emerging concept of ONE HEALTH

There are estimated to be 100,000 medical manuscripts containing knowledge of the uses of medicinal botanicals for human (Ayurveda), veterinary (pashu-ayurveda) and agricultural (vriksh-ayurveda) applications. TDU has initiated work on cataloging and digitization of medical manuscripts of India and completed cataloging of 17,000 manuscripts.

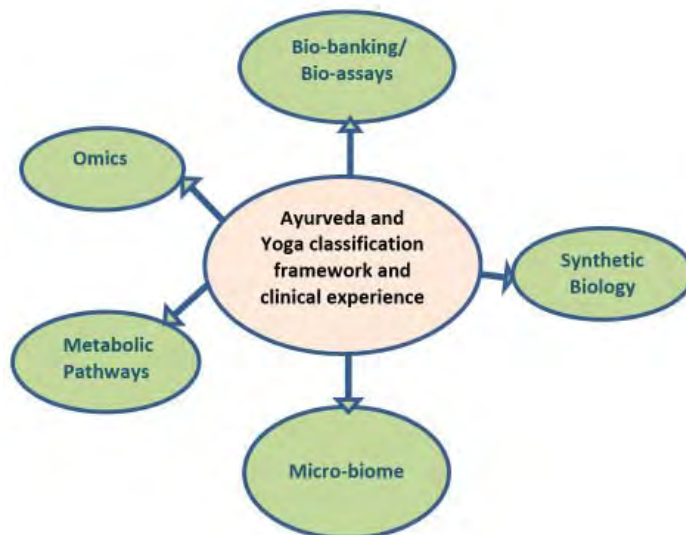
TDU believes that interfacing traditional knowledge of healthcare with advanced scientific research will contribute to two emerging global needs viz., Integrative Health Sciences and ONE HEALTH

This is the future TDU vision for conservation and sustainable use of medicinal plants, and we will be pleased to collaborate with genuinely interested and competent international organizations for the execution of the vision.

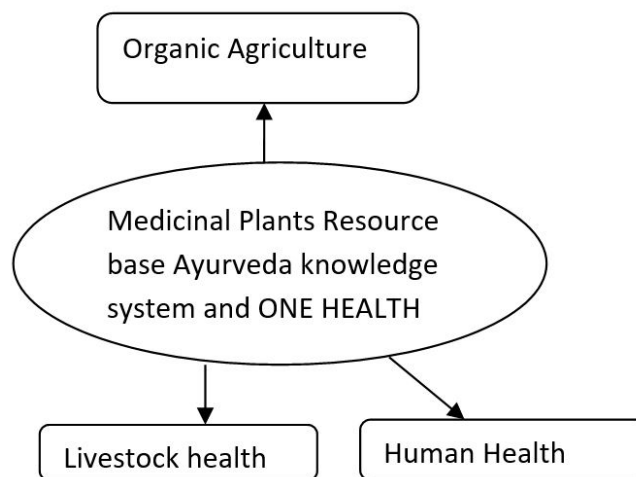
5. The 10 innovation objectives we visualize during the ensuing decade (2019 – 2029)

1. Create an open access portal on native medicinal plants searchable at taluka, town, city, state, and regional levels with spatial information on occurrence, populations, trade and threat status, insitu conservation initiatives, local nurseries and herbal gardens and reliable applications of indigenous knowledge for human, vet and agriculture. The portal will be searchable at taluka, town, city, state, and regional levels.
2. Demonstrate a strategy for strengthening management of Medicinal Plant Conservation Areas (MPCA's) by State Forest Departments (SFDs) and in the preparation of State level 5-year plans for conservation and sustainable use of medicinal plants.
3. Build Capacity in State level research institutes to engage in collaboration with SFDs for long term threat assessment and species recovery of medicinal botanicals.
4. Demonstrate methodology for conducting genetic variability and plant endophyte studies on selected clinically important species, which are critically endangered in order to support both insitu conservation and sustainable use programs for user groups.
5. Create network of home and community gardens and nurseries in selected talukas.
6. Demonstrate models for health and livelihood security programs executed by community based organizations in partnership with professional organizations.
7. Strengthen national herbarium and raw drug repositories of medicinal botanicals in TDU and regional herbaria in selected research institutes and botany departments.
8. Develop innovative medicinal plant extract library in TDU of traditionally used fractions and not only bio-actives.
9. Build Capacity in State Forest Departments, research institutes, regional herbaria, folk healers, citizen groups and community based organizations by designing and implementing specialized education and training programs for insitu conservation, threat assessment, species recovery, nursery techniques, herbarium and raw drug repository management, digitization techniques, assessment of genetic variability and indigenous knowledge of plants for human, veterinary and agricultural purposes.
10. Seed International Cooperation with relevant foreign universities and research organizations engaged in research and outreach on biodiversity and one health ■

THE INTEGRATIVE HEALTH SCIENCE PLATFORM



ONE HEALTH PLATFORM



Darshan Shankar is Vice Chancellor of the Trans-Disciplinary University (TDU) Bangalore, India. TDU (www.tdu.edu.in) is a legislated form of FRLHT, which is a member of the Sacred Seeds Network.

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MORE STORIES FROM THE UPS BOTANICAL SANCTUARY NETWORK

The United Plant Savers Botanical Sanctuary Network (BSN) is one of our most important ongoing projects. This is a network of over 100 landowners who have formally expressed their intentions to steward existing populations of at-risk native medicinal plants and/or reintroduce these plants to their farms and landscapes. We view these Botanical Sanctuaries as living seed banks managed by well-intentioned conservationists that are poised to spread the native germplasm across the greater landscape when conditions allow.

This concept of native plant repopulation after disturbance has been demonstrated at the original United Plant Savers Botanical Sanctuary in Rutland, Ohio. After the brief but devastating surface coal mining that took place on the sanctuary land in the early 60's, followed by years of erosion and abuse before reclamation, native plants are returning to these previously mined areas of the sanctuary. This relatively quick repopulation of the disturbed land by native plants is primarily due to an undisturbed pocket of biodiversity that remained after the mining took place. Humans, other animals, and natural systems helped to spread seeds and plant material from this remaining "plant sanctuary" across the previously disturbed area to regenerate the land. We believe that the UpS Botanical Sanctuary Network has the potential to serve this same purpose on a larger, worldwide scale.

Land that is to be considered for BSN status should at least occasionally be open to the public for educational purposes and also be a place where research on native plants, medicinal plant conservation, and cultivation is undertaken. The sanctuaries in the network range in size from small city lots to large tracts of land consisting of hundreds of acres. There has been a surge in participation in the BSN over the past few years with 29 new sanctuaries in 2017 and 20 new sanctuaries in 2018. Please consider enrolling your land in the UpS Botanical Network. You can find more information on our website, www.unitedplantsavers.org, or by emailing office@unitedplantsavers.org.

Benefits of becoming a member of the Botanical Sanctuary Network include:

- A beautiful metal sign with the UpS logo on it to place at the entrance to your Sanctuary signifying this as a UpS Botanical Sanctuary.
- Priority Consideration for UpS Community Grants. Our Community Grants award \$200-\$500 dollars for community projects involving at-risk plant restoration and preservation. Sanctuary members are given first priority.
- Two weatherproof signs that designate the property as a Sanctuary being used for plant research and educational purposes.
- Botanical Sanctuary Resource Guide that includes where to order botanical signs for medicine trails, sources of grants and funding raising, useful books and information sources, etc.
- Listing on the UpS Website and social media channels.
- Opportunities to promote classes and workshops at your Sanctuary on our website and social media channels.
- Opportunities to publish your Sanctuary story on our website and in our annual *Journal of Medicinal Plant Conservation*.





BIODYNAMIC MEDICINAL HERB FARM AND FARMER TRAINING COURSE ATTRACTS INTERNATIONAL ATTENTION WHILE ENCOURAGING US TO BUY LOCAL

by Gabriel Noard

“I’m a farmer who grows farmers.”

What started as an organic veggie and herb farm 8 years ago is now a thriving Certified Biodynamic® and organic medicinal herb farm and training center, as well as a United Plant Savers Botanical Sanctuary.

Founder Gabriel Noard recognized the need to work with his environment, including his community and saw the need for sustainably grown herbs that would protect the plant populations in his local Appalachian Mountains, and build the diversity and health of his farm, and ultimately the prosperity of his community.

What he found was that not only are the herbs endangered, but that the knowledge of how to grow, harvest, dry, and process these herbs in scale is also a much endangered art. Though the public’s desire to learn is growing, there are only a handful of sustainable production size herb farms in the country—a country that spent \$37 billion on natural supplements last year.

Within 3 years of orienting the farm to only medicinal herbs, the farm, Pangaea Plants has had visitors and applicants from all across the U.S., and as far as Vancouver, B.C., Kenya, and Beijing. The popularity led them to be voted Best Farm Start Up of the Country by the National Farm Bureau and put on the cover of *Acres*

USA magazine. The demand for knowledge on how to sustainably supply our growing appetite for herbs is genuinely on the rise.

The increase in populations and interest in medicinal herbs has grown exponentially and the pros and cons of this have been felt throughout the wild. There is currently a culmination happening highlighting the importance of sustainably growing the domestic supply of medicinal herbs, and providing the country with safe, effective unadulterated herbs.



Echinacea (Echinacea purpurea)

Pangaea Plants herbs, grown as close to better than nature as you can get, are Certified Biodynamic by Demeter USA, and the quality and freshness of their herbs are always remarkable. The farm is kept without additional inputs and the biodiversity of the land encouraged. Crops are alternated with cover crops, and tons of compost are made every year. The farm meets strict standards of agriculture set in place nearly 100 years ago. That includes placing value on the parts of a farm that are often absent from farms today, namely biodynamics. This includes valuing biodiversity and working with the energetic and cosmic forces that help keep the environment in balance. The centurion methods also naturally support regenerative agriculture, which has now become known as the surest way to combat climate change.

The company also produces these herbs according to modern strict federal standards outlined in the Food Safety Modernization Act (FSMA) that dictate further the safe growing and harvesting procedures for the human consumption of these sustainably grown herbs.

Pangaea Plants has developed an Herb Farmer Training Course to teach students the intricacies of the natural products industry. Led by industry experts, the course is designed for those serious in a career in the natural products industry. Three courses are offered—a spring and fall 6-week course and a summer long 6-month course. In one year there could be 40 new herb farmers trained, each able to convert 10 acres or more into sustainable certified biodynamic herb production.

The demand for sustainable domestic and local herb production can only be sustained if we ask for it. Support for this course has until now only been a conversation, and options for these herbs were nonexistent. The situation will only change as we continue to seek the sustainable herb farmer and their products.

Farmer Gabriel Noards' thirst for connections to the herb growing community is insatiable. Comments, tricks, and tips for herb growing are graciously received. He and the farm can be reached at www.pangaeaplants.com. ■



Harvesting Blue Vervain (*Verbena hastata*)



Boneset Flower (*Eupatorium perfoliatum*)



Lemon Balm (*Melissa officinalis*)

FROM PASTURE TO SANCTUARY IN 10 YEARS: AN INTRO- DUCTION TO FARM CENTER'S WORK, TRANSFORMING THE WORLD ONE WATERSHED AT A TIME!

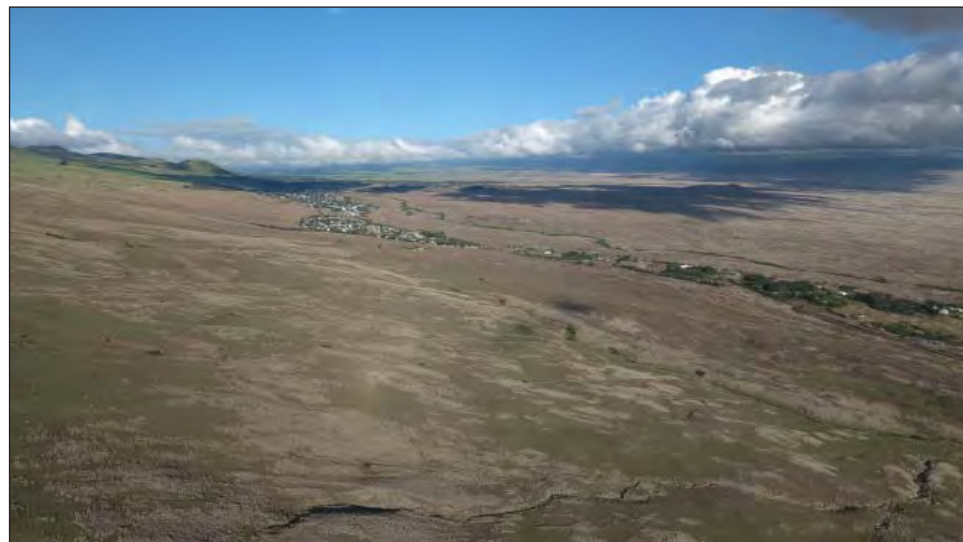
By Sophia Bowart and Neil Logan



Multi-strata agroforest at FARM Center. Photo: N. Logan, 2018.

The story of Hawaii's current ecological predicament is similar to other colonized tropical islands. In short, the indigenous populations were subdued and relieved of their natural resources. This process has left deforested lands across the globe. The vast majority of Hawaiian forests has been logged and will never return to their former glory, state of abundance, and rare diversity. What can be regained, however are functional ecosystems and watersheds, but this will take focus, knowledge, and lots of hard work!

On the island hundreds of thousands of acres have been transformed from lush tropical evergreen



Denuded pastures of Kohala and Mauna Loa. Photo: F. Pasini, 2016.

forests of *Acacia*, *Erythrina*, *Santalum*, *Diospyros*, and others into grasslands of low diversity and dwindling productivity. On the Kohala mountain road in North Kohala, Hawaii, there are majestic views peering across the massive valleys made by Mauna Loa and Mauna Kea. A description of the ecology of the region before 1840 reads more like a well-manicured garden of great diversity and beauty than the eroded and desiccated landscape of 2019 (Tummons, 2002). Today, the garden has been replaced with acres of grass that stay brown at least half the year. Soils are eroding, and grasslands are failing due to overgrazing and lack of nutrients. Is there a plan for restoring degraded lands like these that have become so common all over the planet?

One plan, as presented and demonstrated by Forest Agriculture Research Management Center (FARM Center), is to take degraded pastureland and return it to forest, while building soil, producing value, and leaving behind rare endemic forest species.

In 2008, Sophia Bowart and her family purchased a 20-acre parcel on the Kohala Mountain and began planting trees to help restore the watershed. Forest Agriculture Research Management Center (FARM Center) was created six years later, with her husband Neil Logan, out of the need to systematize and develop functional agroforestry systems to share with the local community and expedite the process of adopting afforestation.

Costs are extremely high in Hawaii. For the past 100 years, cattle ranching has been very successful because it allows huge agricultural acreage to be managed with only a few laborers. The neighbors to the south of FARM Center are able to run 300 head of cattle on 300 acres with only 3 ranch hands! Unfortunately, tropical pastures don't stay nutritionally rich for long because the nutrients are constantly being leached from the soils via rain. Today it is obvious that the pastures are worn out and need to rest, but the ranching operations can't afford to rest the pastures long enough to bring them back to health. FARM Center has been working to research and demonstrate methods and systems for



Mauna Loa endemic forest. Photo: N. Logan, 2017.



Multi-strata agroforestry system with manioc emerging through taro 4 months after planting. Photo: N. Logan, 2017.

regenerating the soils and hydrologic cycles that are economically viable to allow for a transition in land use.

In 2010, Sophia Bowart and Neil Logan began to implement agroforestry systems inspired by Ernst Gotsch. At the start, there were only ~11 species identified on the property. It was essentially an open pasture with a *Casuarina* windbreak on the south and east boundaries. Initially the goal was to figure out how to get a foothold in the tight Kukuyu grass mat. Every seed and cutting that might be useful in the harsh pioneering environment was collected and planted. Plantings were dense and diverse to help overcome the extreme winds of the site and to combat the aggressive runner grass with sheer numbers. In time, the guilds began to radiate outward, shading out the grass. These efforts created just enough change in the conditions that new organisms became better suited. New, more desirable species were planted and/or moved in and replaced the Kukuyu grass without weeding, spraying herbicide, or really much management at all.

Today, (the end of 2018), the project has moved through the pioneering and accumulation phases of succession and is now at the very beginning of the abundance step. There is now what most people would consider a “forest” with at least 5-7 layers of stratification and emergent species reaching 40-60 feet in height. There are many productive fruit trees, NTFPs, and annual vegetable crops. The site stays lush and green all year even during times of drought. This has been accomplished without



Endemic guild of Koa, Hapu, Loulu, Iliahi and Nai’o. Photo: N. Logan, 2018.

the use of pesticides, herbicides, and chemical fertilizers and with only rainwater to irrigate! In addition to the food and other products, there are endemic, long-lived species interspersed throughout the farm. These will be long-term (climax) species that will outlast us and replace the farmed species in time.

There are half a dozen rare endemic species at the site that will outlive all other tree crops such as *Santalum paniculatum*, *Acacia koa’ia*, *Erythrina sandwicensis*, *Diospyros sandwicensis*, and *Tetraplasandra hawaiiensis*. This project is a demonstration of how it is possible to take a degraded pastureland and return it to forest, while building soil, producing value, and leaving behind our rare endemic forest species. This essentially reverses the current trend in agriculture where forests are cleared to make way for crops, then turned into pasture,



Kohala leeward pasture. Photo: N. Logan, 2012.

later to be abandoned as wasteland. Currently, FARM Center is developing tools and educational materials to help others achieve what we are doing. As a project sponsored by United Plant Savers, FARM Center is honored to continue to give sanctuary to rare medicinal, edible, and culturally significant plants in the North Pacific.

Please visit our website (www.farmcenter.org) for more info and to find out how you can participate in helping restore watersheds everywhere. ■

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Neil Logan is an applied ethnobotanist trained in permaculture and Syntropic Farming. He has developed a bio-regional database of ethno-ecology, Hawaii's first Living Fuel Break prototype, site-specific project plans, and has consulted on large acreage in arid Hawaii. In addition, Neil has been working with the United Plant Savers and the Hawaiian Reforestation Program to accurately assess the threats to Hawaiian Sandalwood and how to restore its habitat. Neil founded the consulting firm Integrated Living Systems Design in 2006 and now co-directs FARM Center.

Sophia Bowart has a background in non-profit development and sustainable business management. She initiated and managed the development of Mohala Lehua Farm (a forest farm devoted to regenerative Hawaiian ecosystems) in 2006 and completed her MBA in Sustainable Business Management in 2009. In addition to being a co-presenter and co-author with Neil Logan, she has also worked to promote the Buy Local/Eat Local Campaign and the Hawaii Alliance for a Local Living Economy (HALE). Her passions for the economics of sustainable agriculture have inspired her to co-found FARM Center.



Agroforest regrowth after pruning with Sandalwood and Nai'o in foreground and background. Photo: N. Logan, 2017.



Recently pruned agroforest with an abundance of wood and organic matter to feed future crops. Photo: N. Logan, 2018.



Cassava, Banana, Loulu Alahe'e, Koa'ia guild. Photo: N. Logan, 2018.



Native grasses and wildflowers replace areas of turfgrass between the swales.

7 ACRE WOOD FARM

Burnsville, Virginia

Sanctuary Stewards: Joe and Anne Murray

Our Second Year as a Botanical Sanctuary

We're writing this summary, comfortable in our little cottage, while the land around us is experiencing the polar vortex, gripping much of the nation this January (2019). While we're concerned about the health of our plants, we take comfort in knowing our work to improve soil health improves the resiliency of our sanctuary and its ability to respond to ever-increasing severe weather events associated with climate change.

Upon seeing our United Plant Savers sign, visitors inquire about the purpose of a botanical sanctuary. We enjoy sharing information about the UpS Botanical Sanctuary Network and how we feel we're contributing to the UpS mission. On several occasions we've had to clarify that the network initiative is a partnership between a non-profit organization and citizens volunteering their land and labor, not a state or federally funded program. These conversations often drift to a discussion of who should regulate the growing,

harvesting, preparation, and dispensing of herbal medicine. Until the plants can speak for themselves, we're happy to be their spokespersons!

Taking advantage of the significant slope of our land, we installed a series of swales, each with a themed plant (medicinal herbs, berries, and nuts). In the nut swale, hazelnuts and chinquapins should be of sufficient size in a couple years to provide enough shade and protection for the incorporation of "At-Risk" medicinal plants. Our task this year is to identify (and grow) plants associated with "At-Risk" medicinal plants in nature. In addition to planting these "companion" plants, or "guild members," in our forest, we will incorporate them into our swales so "At-Risk" medicinals will feel right at home. Between our swales, we allow just enough space for walking paths and let the rest of the land go wild with native grasses and wildflowers.

Last year, we built an electric deer fence (image) to protect approximately 2 acres of cultivated land. During the planning phase, we thought it prudent to extend the perimeter of the fenced-in area to include a portion of the forest to separate deer from future plantings of ginseng (*Panax quinquefolius*) and goldenseal (*Hydrastis canadensis*). After our faithful BCS tractor ("Tina") blazed

a path through the forest, we attached 2x4's to metal fence posts at a 45-degree angle and affixed seven wires, spaced approximately 1' apart. After about a month of "learning," that involved regular repair and replacing of electrical lines, the deer "accepted" the proposition that this portion of the forest is "off limits."

In 2018, we gave nine presentations on sustainable land care practice, highlighting our botanical sanctuary. These presentations addressed diverse audiences ranging from local garden clubs, native plant societies, patrons at public libraries, and even one at the Biodynamic Farming conference in Portland, Oregon. Joe taught a day-long workshop on woody plants at the Allegheny Mountain Institute, a permaculturally-inspired educational non-profit organization training young adults in creative food growing systems and public outreach. Anne was a featured herbalist at our local farmers market.

We appreciate the support and information made available by UpS on their website, Facebook posts, and in the *Journal of Medicinal Plant Conservation*. Reading about the great things happening at the UpS Botanical Sanctuary and the other sanctuaries in the network renews our sense of purpose and realization that our sacred 7 acres is part of a much greater whole.

In 2019, we continue to practice the three principles we learned at the Findhorn Foundation, an intentional community in Scotland: co-create with the intelligence of nature, practice inner-listening, and that our work is "love in action." ■

Anne Bryan and Joe Murray
7 Acre Wood Farm
Burnsville, VA
www.7acrewoodfarm.org



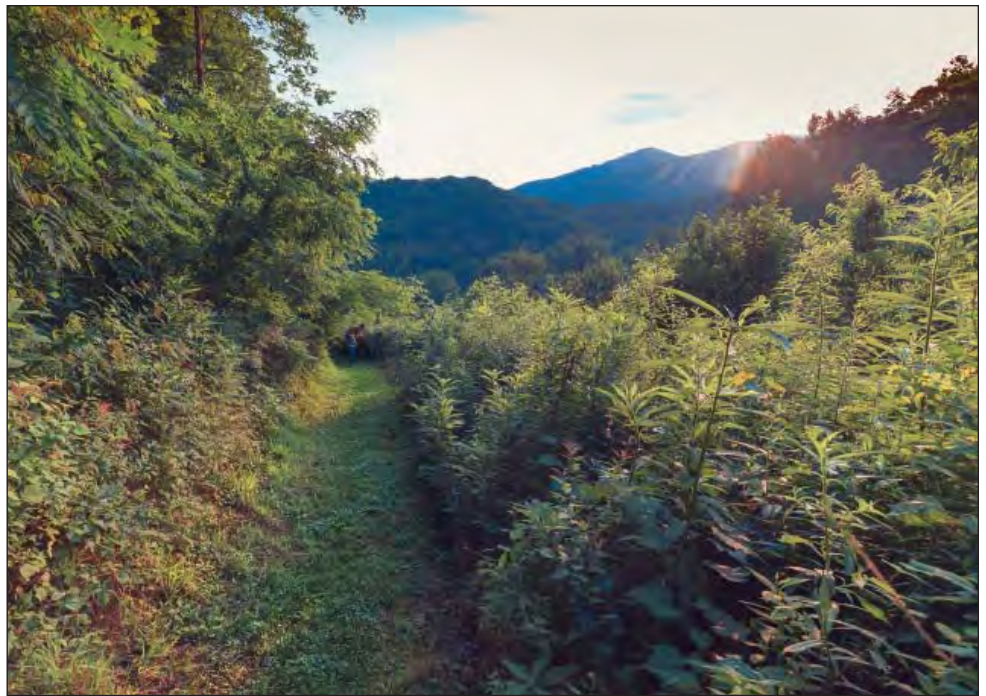
Mowing a path through the forest for our new deer exclusion fence.



2018 kept us busy sharing information about our land care practices.



Mary Morgaine planting natives on the Nature Trail



The Frank Cook Nature Trail

HERB MOUNTAIN FARM LEARNING AND LODGING CENTER AND BOTANICAL SANCTUARY

Weaverville, North Carolina

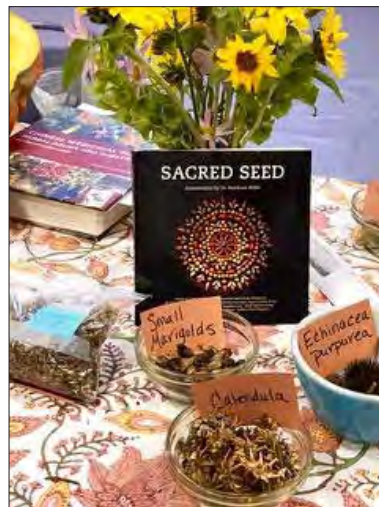
Stewards: Hart and Mary Morgaine Squire

Back in 1962, in Connecticut, Hart Squire led his first plant walk in the woods. He had been observing and tending the native plants behind his house—the trilliums (*Trillium* spp.), skunk cabbage (*Symplocarpus foetidus*), lady's slipper (*Cypripedium acaule*), and partridge berry (*Mitchella repens*). He wanted to share the unique beauty and medicine of these plants with others, so he gathered a group together and pointed all these plants out to them along the trail. At the age of 12, Hart knew that these green beings were special and needed to be honored and protected.

In 1968, Hart's family bought a piece of property in the Reems Creek Valley, in a small town called Weaverville, about 20 miles north of Asheville, North Carolina. His parents still lived in Connecticut at the time, but Hart moved on to the land and continued to deepen his relationship with the plants. He used all of his resources to improve the earth upon which he had landed—a piece of property that had been a local dump and had suffered so much erosion from poor land management that one gully stood 20 feet deep and 30 feet wide!

Hart spent years clearing away trash and hauling it to the dump, while he spent every opportunity he could, hauling in any kind of manure, hay, wood chips, or leaves to make compost pile after compost pile to build up the soil. He was a young idealist and was determined to take a piece of land completely depleted (the gardens were really like subsoil—bright red and either sticky and slimy when wet, or hard as a brick when dry).

For many years, Herb Mountain Farm sold flowers, herbs, garlic, and vegetables to local stores and restaurants. All this time Hart was mostly ridiculed by the local Extension Service and his neighbors for not ever using chemicals for growing his gardens and small farm. Back then, the USDA didn't think Hart was a legitimate "farmer" and laughed at the idea that a farm could not use chemicals! Forty years later, few people realize what a "hard-row-to-hoe" Hart was determined to maintain, as organic agriculture has become more and more mainstream. Herb Mountain Farm is now celebrating its fiftieth year chemical-free!



Over the years this land has become a jewel of a place, mostly because Hart has dedicated his life to it. Hart sometimes shows people around and points out

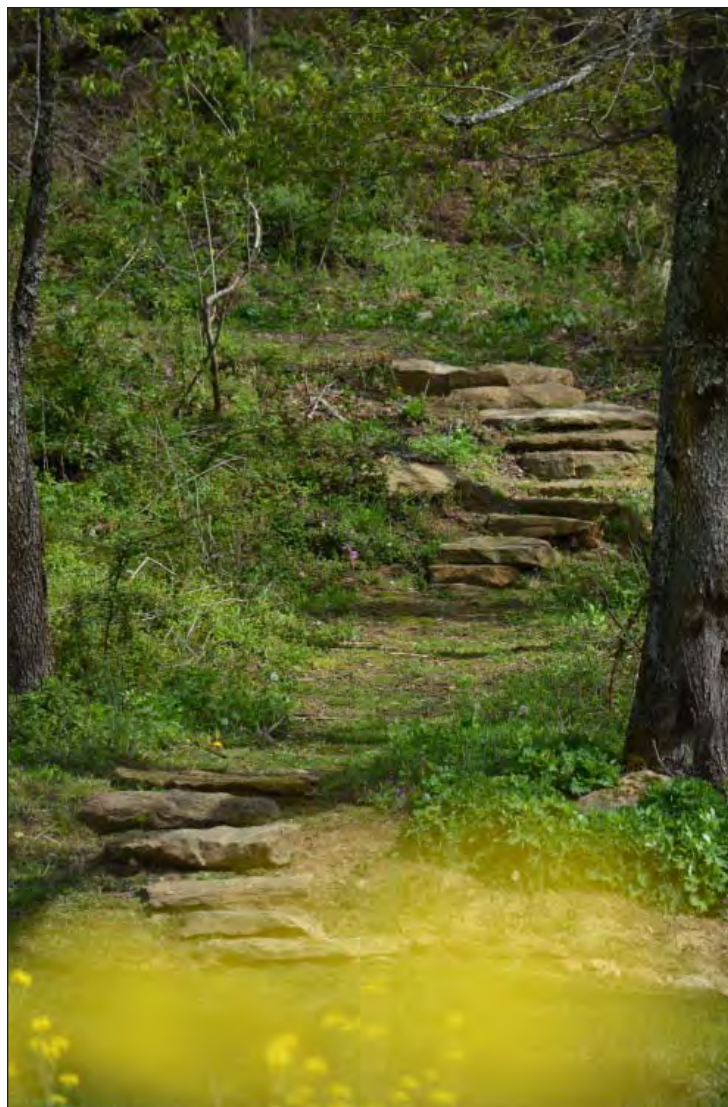
how Nature—way more than him—has regenerated and healed the land simply because of humans not getting in Her way.

In 2005, Mary Morgaine came on board as an employee on the garlic crew and began applying her knowledge of herbs and gardening while learning from Hart countless ways to steward Earth with consciousness and loving

tenderness. In 2012, they were married and began to grow a vision of turning the property into a learning center. Many energy efficient buildings were built or renovated here, and so they worked on transforming two of them into lodging for guests. They also established a mile long nature trail around the land and named it in honor of Mary Morgaine's late partner and botanical explorer, Frank Cook and added numerous edible and medicinal gardens in addition to what was already here. Inspired by United Plant Savers Botanical Sanctuary Network, they became members in 2016 and continue tending to and bringing many plants into the different ecosystems of the property.

Every plant is like an old or new friend. The winter gets hard because we can't see our friends as much, but we know they are there, just taking a long and hearty rest, like we all should! Our dear human friend, Marc Williams, Executive Director of Plants and Healers International, has also helped increase the diversity of plant life here by donating many native plants over the past few years. These include several *Trillium* spp., *Jeffersonia diphylla*, *Asclepias* spp., *Ligusticum canadense*, *Chamelirium luteum*, and lots more! And thank you Robert Eidus of the NC Ginseng and Goldenseal Company for donating goldenseal (*Hydrastis canadensis*) starts, as we try to encourage and coax that remarkable being back into the landscape.

Hart starts a lot of the plants by seed, including spikenard (*Nardostachys jatamansi*), angelica (*Angelica* spp.), butterfly weed (*Asclepias tuberosa*), echinacea (*Echinacea* spp.), blazing star (*Liatris spicata*), lobelia (*Lobelia* spp.), wild senna (*Senna hebecarpa*), bee balm (*Monarda* spp.), and anemone (*Anemone* spp.). These are just a few of the thousands of seedlings Hart sets out every year.



Entrance to Frank Cook Nature Trail



Marc Williams admiring the Ragweed (*Ambrosia psilostachya*) that feeds the wildlife and gives major compost back to our soil every year



Hart has been working this land since 1970

Mary Morgaine sprinkles the trail with shooting stars (*Dodecatheon* spp.), yellowroot (*Xanthoriza simplicissima*), turtleheads (*Chelone* spp.), phlox (*Phlox* spp.), and horsetail (*Equisetum* spp.). We have over 150 species of trees and shrubs on the farm and over 550 species of perennial plants, not including ferns and mosses! This is our life work, our passion, to cultivate diversity and work in respectful planetary stewardship with this land. Our website (herbmountainfarm.com) has a complete list of our species inventory if you would like to read further.

Many years ago we also turned 105 acres of this property into a 100% protected conservation easement that is also available for hikes and plant-walking. The upper part of our mountain land holds even more botanical treasures, as a hike involves moving up through close to a thousand feet of altitude—like going from southern Pennsylvania to central Connecticut climate zones! Our buildings, nature trail, and gardens are at about 2800 feet.

We have just this year (2019) finished our remodel and opened our Learning and Lodging Center with the vision it will draw folks here looking for not only a place to rest and renew, but to also teach and learn—to find something of deep meaning from nature to take back out into the world and share with others. We are determined to leave a legacy of Herb Mountain Farm as a learning environment—drawing in teachers to hold classes and workshops centered on medicinal and edible plants and healing, as well as providing an advancement of study centered around restoring and honoring Nature.

We hope to meet some of you plant lovers along the journey! ■



Veritas Lodge



Lupine Lodge

SLEEPING IN THE FOREST

by Mary Oliver

I thought the earth remembered me,
she took me back so tenderly,
arranging her dark skirts, her pockets
full of lichens and seeds.
I slept as never before, a stone on the riverbed,
nothing between me and the white fire of the stars
but my thoughts, and they floated light as moths
among the branches of the perfect trees.

All night I heard the small kingdoms
breathing around me, the insects,
and the birds who do their work in the darkness.
All night I rose and fell, as if in water,
grappling with a luminous doom. By morning
I had vanished at least a dozen times
into something better.



Entrance, Sacred Roots Herbal Sanctuary

SACRED ROOTS HERBAL SANCTUARY

Shepherdstown, West Virginia

Sanctuary Stewards: Hillary Banachowski and Keir Knoll

We've just surpassed a major milestone this year—that of a third growing season under our belts. To be honest, I could never have imagined this day would come because I was so overwhelmed by the immensity of the work that lay ahead. My husband Keir and I have had our hands and hearts completely immersed in the all-consuming, exhausting, but oh so meaningful work of growing a small medicinal herb farm. I looked up and suddenly three years had gone by.

You see, this was no small feat. Thirty-four acres of abused and deeply disturbed land called out to us. No driveway, no well, no house, and no prepared beds—only Johnson grass, dead corn stalks, and depleted soil. I questioned the sanity of our decision at least once a week. Most of our first year was spent in the compost zone. It's akin to the twilight zone, but involves back-breaking work, sweat, and real live salty tears. It was a time of breaking things down and being broken open so that new life could emerge. Time was non-existent.

Year two offered a glimmer of “oh my gosh, it's happening...we ARE doing this”. Tiny sprouts of hope were popping up everywhere in the realm of infrastructure, cultivating community, and the health of the gardens themselves. In the spring of our third year, something felt different. There was an ease to the season. We had running water, well established beds, and the seeds we had planted had grown deep, strong roots. I noticed that the pace and flow of things felt sane and right, and the once depleted soil is now chock full of fat, juicy, happy worms.

To the land, I would imagine, this is no surprise. In her infinite wisdom, she will continue to heal herself and us along with her. Yet, what has surprised me the most about the journey is the people who have shown up. Like the plant allies who support us along the way (major kudos to beloved tulsi), we are still here because of the dear hearts who came to help lift up our vision, learn, connect, and work their asses off alongside us. Our farm is aptly named Sacred Roots Herbal Sanctuary. Little did we know at the time just exactly how much power the word sanctuary could hold. Year after year, interns, friends, volunteers, work crews, and total strangers have now become family. It truly takes a village. In the process, we've all been stretched, shaped, and transformed by this generous and wise land we call home. Who was healing whom?

Like life, this sanctuary is a perpetually evolving, organic work in progress and a labor of love to last a lifetime.

Hillary Banachowski and her husband Keir Knoll live in Shepherdstown, WV and feel grateful beyond words to be “growing where we've been planted.” ■

sacredrootswv.com



SHARONDALE FARM: A REPOSITORY OF PLANTS, FUNGI, AND KNOWLEDGE

Cismont, Virginia

Sanctuary Steward: Mark Jones

A short drive east from Charlottesville, Virginia is Sharondale Mushroom Farm, located in Cismont, in the Piedmont and the National Historic District of the Southwest Mountains. The land in this eastern part of Albemarle County is rolling, mixed-use farm and forest with large and small landholdings. Sharondale is about seven acres and has a historic house and outbuilding built by my great-great-grandfather, who was a house builder and a wheelwright. I know this place from my earliest memories. My grandmother lived here, and our family visited during summers and holidays. My earliest garden memories of picking ripe yellow tomatoes with my grandmother, playing in the boxwood “rooms” and eating Concord grapes to the point of bursting are here, too. My history here, living and working in Cismont for the past 15 years, the beautiful landscape, and fellow villagers make this a special place.

The farm is open land around the house with cultivated forest gardens and mixed, predominantly oak hardwood forest with a spring run and small wetland. I have been building the mushroom farm since 2004, when I arrived to live here. My grandmother had the foresight to grow several heirloom plants, including peonies, magnolias, and an old apple tree. I have been cultivating a forest garden of useful perennials into which a friend plants annual flowers, herbaceous perennials, and food plants.

In addition to maintaining the old house and buildings, current conservation practices on the farm include certified organic mushroom production; a rainwater catchment pond; no-till garden planting; composting; mulching; lumber-milling from storm-felled trees; recycling; permeable access roads; equipment maintenance; and increased time in the hammock.

Sharondale Farm offers workshops and occasional tours of the farm and gardens in the spring and fall. Some of our workshop offerings for 2019 include *Growing Gourmet and Medicinal Mushrooms*, *Gardening with Mushrooms*, *Mushroom Log Inoculation 101*, and a Piedmont Virginia CRAFT (Collaborative Alliance for Farmer Training) tour. The farm is available for private tours and workshops. We've had middle school students, farmer groups, and garden clubs visit.

I have close ties with the local herbalist community and know about United Plant Savers through them. In 2017, we joined United Plant Savers as a medicinal plant and mushroom sanctuary. The idea of local and regional plant repositories resonates with my belief that regional flora, fauna, fungi, and local knowledge (FFFK) of agroecosystems need sanctuary from exploitation of the capitalist kind. Development of such repositories

happens primarily on small-scale farms that depend on ecological diversity for optimizing yields of food, medicine, and culture. I practice farming as a creative way to learn about Kingdom Fungi and its myriad relations to the world of FFFK. My study is the cult, culture, and agriculture of fungi.

Since starting Sharondale Mushroom Farm, I have come to appreciate more deeply the ancient relationship fungi have with our world and our culture. That is why I like to think of the farm as a fungus farm. I grow mushrooms—the fruit of Kingdom Fungi—but also work to understand fungi of all kinds and help hobby growers and small farmers develop the edge that supports diversity and resilience in their gardens, farms, and communities. This includes, for farmers, the ability to realize income from their farm byproducts and “waste”.

With increasing population pressure on forests and wildlands and changing land use, it is necessary to create citizen-driven local repositories of fungi representing landraces of edible, medicinal, and useful fungi. I'm working to ensure that Sharondale Mushroom Farm serves as a plant and mushroom (fungi) sanctuary and repository for regionally important species. We conduct ongoing research integrating fungi into agroecosystems and develop cultivation protocols for many species in our region.

At Sharondale Farm, cultivating mushrooms happens at the intersection of science and art. The farm culture bank holds more than 100 strains of gourmet and medicinal mushrooms. A few of the collected wild strains have been developed into productive food and medicine crops, and several have shown potential for bioremediation of diesel oil and hydraulic fluid, two common pollutants on small farms.

While growing mushrooms is a good business, approaching fungi from a broader perspective helps push the edge of knowledge about what is possible for our future as a species. Fungal allies co-create resilience in agriculture by improving the health of soil and crops and animals, and in our communities by providing healthy food and jobs. Our farm works to demonstrate that fungi can help heal the planet by supporting human designed ecosystems.

Sharondale Mushroom Farm is certified organic for mushrooms and mushroom spawn by Pennsylvania Certified Organic. Our facility is USDA-GAPs certified which is opening new markets for our specialty retail mushrooms. We are producing useful products with our spent mushroom substrate and developing our organic mushroom compost and vermicasting production. ■

Mark Jones is a farmer and mycologist, a founding member of the Piedmont, Virginia CRAFT, a member of the Pennsylvania Association for Sustainable Agriculture, Future Harvest Chesapeake Alliance for Sustainable Agriculture, and serves on the board of the Virginia Association for Biological Farming.



Turkey Tail (*Trametes versicolor*)



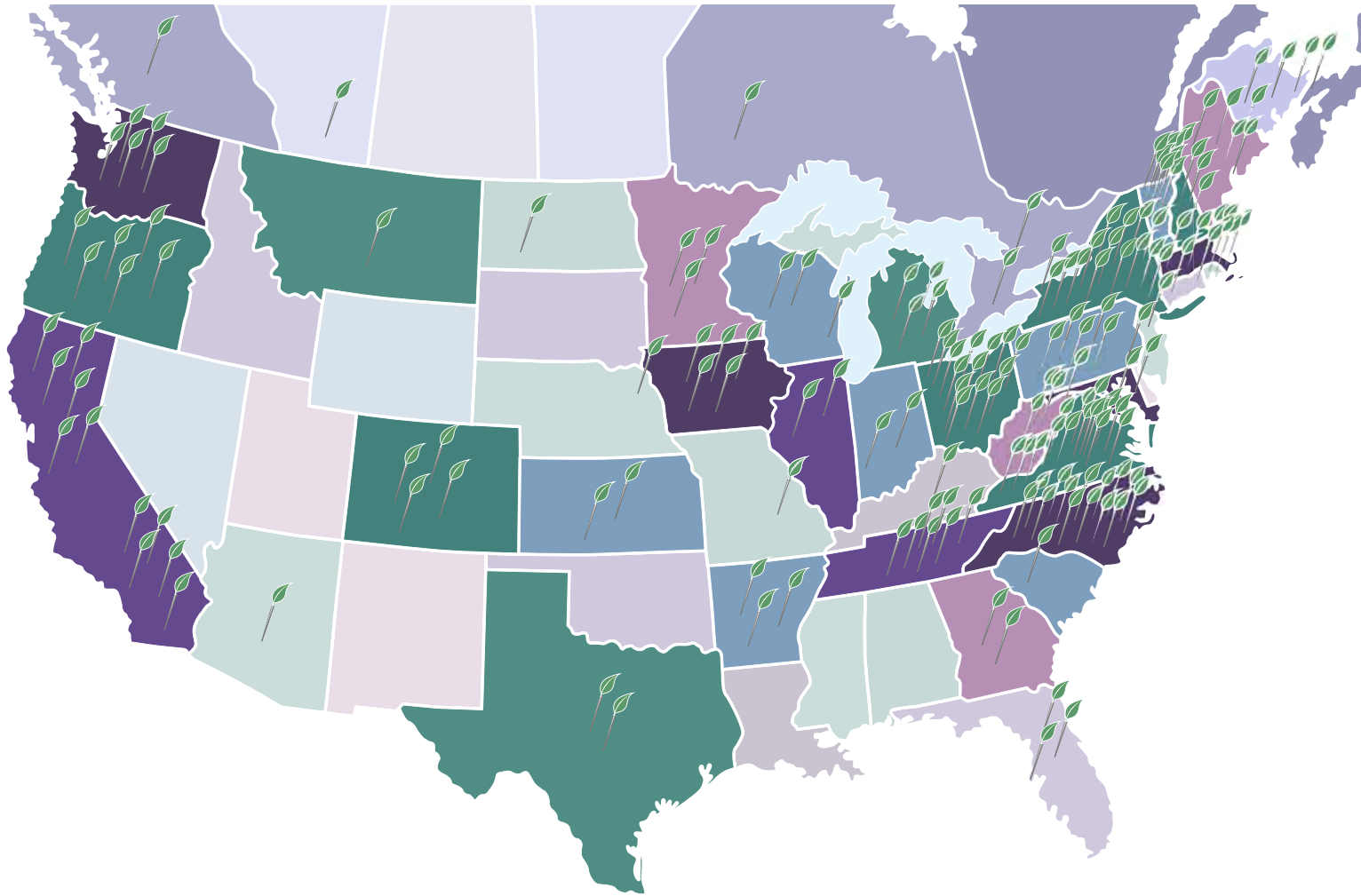
Oyster Mushroom (*Pleurotus ostreatus*)



Reishi Mushroom (*Ganoderma lucidum*)

UPS BOTANICAL SANCTUARY NETWORK: ACTIVE MEMBERS

REGISTERED SANCTUARIES THROUGHOUT THE US & CANADA



7 Acre Wood Farm

Burnsville, VA

Aaxis Health/Nature Cares Nursery and Botanical Sanctuary

Portland, OR

Acadia University Harriet Irving Botanical Gardens

Fountain Valley, CA

Atka's Garden: Sacred Warrior & Wolf Conservation Ctr. Sanctuary

South Salem, NY

Appalachia Ohio Alliance

Logan, OH

Appalachia School of Holistic Herbalism/Soufflower Farm

Asheville, NC

Ataga'hi

Marengo, IL

Avena Botanicals

Rockport, ME

Bastyr University Dept. of Botanical Medicine/Bastyr Herb Garden

Kenmore, WA

Bean Tree Farm

Tucson, AZ

Bee Fields Farm

Wilton, NH

BeeGood Gardens

Columbus, OH

Bluebird Botanical Plant Sanctuary

Eureka Springs, AR

Brigid's Way

Washington Boro, PA

Broadwell Hill

Stewart, OH

Buck Mountain Botanicals

Miles City, MT

CA & J Farm

Foster, VA

Catskill Creek Native Plant Nursery

Greenville, NY

Cedar Mountain Medicinals

Newport, WA

Cherokee Medicine Woods

Bloomington Springs, TN

Cold Spring Herbals

Attleboro, MA

Dandelion Herbal Center

Kneeland, CA

Desert Canyon Farm

Canon City, CO

Diana's Garden Herb Farm and Sanctuary

Sturbridge, MA

Dibble Hill Native Plant Sanctuary

Saegertown, PA

Down to Earth Massage + Wellness

Knoxville, TN

Dragonfly Medicinals

Vashon Island, WA

Earth Remedies

New Hartford, CT

Earthcrafts Botanicals

Uxbridge, MA

Eden Hyll Botanical Sanctuary

Natural Bridge NY

Equinox Farm

Rutland, OH

Farmacy Herbs Farm

Providence, RI

Fern Hill Nursery

Cottage Grove, OR

Fire Om Earth

Eureka Springs, AR

Florida School of Holistic Living

Orlando, FL

Foodmedicine Farm/ Whole System Design

Moretown, VT

Forsaken Roots

Acme, PA

Frontier Natural Products Co-op

Norway, IA

Gaia Herbs, Inc.

Brevard, NC

Gaia's Peace Garden

Iowa City, IA

Gaspereau Mountain Herb Farm and Botanical Sanctuary

Wolfville, NS

Genie's Dream

Gatlinburg, TN

God's Gardens

Robbinsville, NC

Golden Ratio Magazine/ Indian Mountain Botanicals

Moncton, New Brunswick

Green Comfort School of Herbal Medicine

Washington, VA

Green Farmacy Garden

Fulton, MD

UPS BOTANICAL SANCTUARY NETWORK: ACTIVE MEMBERS

Green Mountain Druid School/Dreamland
Keswick, VA

Green Turtle Botanicals
Nashville, IN

Happy Homestead/Bluebird Botanical Plant Sanctuary
Eureka Springs, AR

Hawthorne Way Botanical Sanctuary
East Meredith, NY

Head and Heart
Boone, NC

Healing Wheel Sanctuary
Hancock, NY

Heartmore Farm
Kents Store, VA

Heartstone Herbal School
Van Etten, NY

Herb Mountain Farm
Weaverville, NC

Herb Pharm
Williams, OR

Herbalist Association of Nova Scotia

Truro, Nova Scotia

Herbminders of Maine
Lubec, ME

High Garden School of Wholistic Herbalism and Traditional Craft
Joelton, TN

Highwoods Heaven Botanical Sanctuary

Yacolt, WA

Historic Loveland Castle

Kings Mills, OH

Humming Bird Hill Native Plant Nursery

Crozet, VA

IdleWild Native American Plant Sanctuary

Wilburton, OK

Indian Pipe Botanical Sanctuary

Linden, VA

Kannagara Woods

Medina, OH

Knowlton Farms

Sebastopol, CA

Labyrinth Gardens

Mulberry Grove, IL

Light Footsteps Herb Farm and Learning Center

Chardon, OH

Listening Tree Cooperative

Chepachet, RI

Luna Farm Herbal Gardens and Botanical Sanctuary

Troy, IL

Lynnwood Herb Farm

Lykens, PA

Maryland University of Integrative Health Garden
Laurel, MD

Mequon Nature Preserve, Inc.
Mequon, WI

Midsummer Farm
Warwick, NY

Mill House
Arrington, VA

Mockingbird Meadows Eclectic Herbal Institute
Marysville, OH

MoonMaid Botanicals/Woodlands Medicinal Sanctuary
Cosby, TN

Morning Star Sanctuary
Westcliffe, CO

Morning Sun
New Egypt, NJ

Motherland Botanical Sanctuary
Willits, CA

Mycoevolve
Essex Junction, VT

N.C. Ginseng & Goldenseal Co./Eagle Feather Farm
Marshall, NC

Native Earth Teaching Farm

Chilmark, MA

Nature Cares Nursery and Botanical Sanctuary

Portland, OR

Nettlejuice Herbals

Cochranville, PA

Oak Creek Botanical Sanctuary

Corvallis, OR

Oasis, Peoples Pantry

Cochranville, PA

Owl Mountain

Clyde, NC

Pangaea Plants

Black Mountain, NC

Perry Hill Farm

Dover Plains, NY

Peterman Brook Herb Farm

N6280 Riverview Road

Porterfield, WI

Phoenix Farms

Augusta, ME

Plant and Gather Forest Farm

Marshall, NC

Plattsburgh Botanical Sanctuary

Plattsburgh, NY

Red Road Herbs

Stanton, NE

Restoration Herbs

Erie, PA

Sacred Mother Sanctuary

Peabody, KS

Sacred Plant Sanctuary at Seattle School of Body-Psychotherapy

Seattle, WA

Sacred Plant Traditions
Charlottesville, VA

Sacred Roots Herbal Sanctuary

Shepherdstown, WV

Saddleridge Sanctuary

Nashville, TN

Sage Mountain

E. Barre, VT

Sage of the Woods

Cedar Falls, IA

Seeds and Spores Family Farm

Marquette, MI

Seven Arrows Farm Botanical Sanctuary

Seekonk, MA

Sharondale Farm

Keswick, VA

Shaw Black Farms

Morning View, KY

Shindagin Hollow Woodland

Willseyville, NY

Singing Brook Farm

Worthington, MA

Sisters Sanctuary

Guilford, VT

Sisters Sanctuary

Guilford, VT

Solidago School of Herbalism

Deer Isle, ME

Soothing Herbals

Goshen, VA

Soulflower Farm

Asheville, NC

Spotted Horse Farm

Weston, WV

Sweetwater Sanctuary

Danby, VT

Terra Firma Gardens

Harrisonburg, VA

The Ginkgo Tree

Cannington, ONT

The Green Spiral

Middleburgh, NY

The Herb Crib

Blairsville, GA

The Living Centre

London, ONT

The Rare Seed Sanctuary

New Gloucester, ME

The Trillium Center

Conneaut, OH

The Wellspring Valley

Stahlstown, PA

Three Leaf Farm

Louisville, CO

Three Springs Farm

Waitsfield, VT

Traditions School of Herbal Studies

St. Petersburg, FL

Two Creeks Organic Farm

Shiloh, GA

Underwood Herbs/Plattsburgh Botanical Sanctuary

Plattsburgh, NY

Vajra Herb Farm

Oskaloosa, KS

Val' Holler Farm and Homestead

Burnsville, NC

Vintage Homesteader

St James, MO

Virginia Tech's Catawba Sustainability Center

Catawba, VA

Walker Mountain Botanical Sanctuary

Deerfield, VA

Wasabi Springs

Barnardsville, NC

Weeds For Wellness

Nescopeck, PA

Wellspring Mountain/ Eclectic School of Herbal Medicine

Lowgap, NC

Wildcroft Hollow

Amerst, VA

Wildflower School of Botanical Medicine

Cedar Creek, TX

Wind Song

Hillsboro, WV

Windsong

Honor, MI

Wise Ways Herbals/Singing Brook Farm

Worthington, MA

Wise Woman Center

Woodstock, NY

Yew Mountain Center

Hillsboro, WV

A GREAT BIG WELCOME TO OUR NEWEST SANCTUARIES!
(Indicated in Green)

VISIT THE SANCTUARY



Visit The Sanctuary

To learn about upcoming events, or to schedule a tour, a visit, or a rental, please contact: United Plant Savers Office: (740) 742-3455 or office@unitedplantsavers.org

Medicinal Plant Conservation Program

6 Weeks in Fall/Spring. Participants learn identification, conservation & cultivation, sustainable wild harvesting practices, medicine making & more.

Hostel In The Woods

- Rooms
 - Camping
 - Cabin
 - Yurt
- HIPCAMP
airbnb

Talking Forest Trail

A 6-mile, information-laden trail that represents years of effort by UpS staff & our supporters. Experience the splendor of this forested herbal treasure chest!



As a member of UpS you can experience the power of our botanical sanctuary yourself. Along with your *Journal of Medicinal Plant Conservation*, sticker, and discounts to United Plant Savers events, UpS members have special privileges at the United Plant Savers Botanical Sanctuary.

The UpS Botanical Sanctuary is the exact location where, 23 years ago, Rosemary Gladstar, Paul Strauss, and a few others first began to talk about the idea of conserving these plants that were providing medicine and income to an ever-growing population of people.

Members are invited to hike The Medicine Trail where, if your timing is right, you will see American ginseng, black cohosh, bloodroot, blue cohosh, false unicorn root, trillium, one of the largest patches of goldenseal anywhere in the world, and more. Beyond the Medicine Trail lie The Main Hollow Trail, Oak Walk, Reclaim Trail, Heart Pond, and miles of additional paths to explore.

Come for the day or spend some extended time with us and really allow yourself to fall in pace with the plants. We have overnight lodging including The Yurt, which offers kitchen, bathroom with shower, and gas heat; Barn Rooms with two single beds, electric heat, and shared bath; the rustic Tornado Cabin nestled in the middle of the forest with two single beds; and in addition we have plenty of primitive camping sites. For more information visit www.goldensealsanctuary.org. If you would like to visit, just email office@unitedplantsavers.org or call 740-742-3455 to get on the calendar. I look forward to sharing this sanctuary with you!

Find the United Plant Savers Botanical Sanctuary on Airbnb and Hicamp

NOW YOU CAN BOOK YOUR STAY THROUGH AIRBNB AND HIPCAMP, TWO ONLINE MARKETPLACE AND HOSPITALITY SERVICES FOR PEOPLE TO RENT SHORT-TERM LODGING.



Much of what makes the UpS Botanical Sanctuary special is the community that has formed around the plants and this hallowed piece of land. Here are a few of our neighbors, board members, and special guests during one of our annual board meeting potlucks.

...United Plant Savers'...

Medicinal Plant Conservation Certificate Program

Hard Working?

Motivated to learn about medicinal plants?

Want to experience United Plant Savers' 360-acre plant sanctuary in Ohio?

UPCOMING SESSIONS

SUMMER 2019

July 8th to August 16th

SPRING 2020

April 13th to May 22nd

FALL 2020

August 31st to October 9th

Apply now for early acceptance!

A HANDS-ON PRACTICAL APPROACH

Interns take classes from local teachers and work on maintenance, conservation, and cultivation projects for 30-40 hours per week. The importance of interns spending time in the woods and developing relationships with the plants is emphasized. Internship program coordinator John Stock oversees the program and is the caretaker for the interns while they are here. Local teachers Paul Strauss, Chip Carroll, Lonnie Galt-Theis, and Tanner Filyaw each lead work crews and apply their own personalities and technique to teach plant identification and uses. In addition to these core teachers, interns will learn from clinical herbalist Caty Crabb, longtime herbal educator Rebecca Wood, UpS Advisory Board member Mark Cohen, artist and flower essence practitioner Katherine Ziff, and more. Interns will work daily with "at-Risk" and endangered species, perform general farm maintenance, landscape maintenance, plant identification, sustainable wild harvest techniques, medicine making, and more!

Application available online at

www.unitedplantsavers.org

office@unitedplantsavers.org

740-742-3455

United Plant Savers Botanical Sanctuary

THE RECLAIM TRAIL

∞ Rutland, OH ∞

Funded in 2016 by an Ohio EPA Environmental Education Fund Grant, the Reclaim Trail guides hikers through the story of past land use and its consequences, current restoration efforts both intentional and natural, and how the power of sanctuary can heal the land and spread biodiversity.



United Plant Savers Center for Medicinal Plant Conservation
Original artwork by Philippe Grenade XIV

2019 ANNUAL MEDICINAL PLANT CONSERVATION AWARD

— Recipient —

JULIET BLANKESPOOR

by Emily Ruff

"Gathering medicine and food from the wild connects us to the natural world, our ancestral heritage, and our wild animal selves. Being involved in our sustenance and healing is boldly empowering and ties us into simple living and the change of the seasons. By gathering our own medicines carefully and conscientiously, we can be assured that our medicines are fresh, of high quality, and gathered in a sustainable fashion." — Juliet Blankespoor

Juliet Blankespoor, director and primary instructor of the Chestnut School of Herbal Medicine, has been selected as the recipient of the 2019 Medicinal Plant Conservation Award.

Juliet has been sharing her passion for plants for over twenty-five years through herbalism and botany education, with a degree in botany from the University of Florida. Through her school's involvement in the UpS Partner in Education, Juliet has demonstrated depth of commitment as a plant steward by not only engaging her students with curriculum that promotes responsible wild-crafting and regenerative herb cultivation, but she directly sponsors a UpS membership for students enrolled in her Online Herbal Immersion Program.

In addition to sponsoring student memberships, Juliet's website is rich with practical plant stewardship resources for anyone looking to grow deeper roots in their plant relationships. Through blog articles such as *"Foraging for Wild Edibles and Herbs: Sustainable and Safe Gathering Practices," "Cultivating Medicinal Herbs, with a Focus on At-Risk Woodland Medicinals,"* and *"Growing Medicinal Herbs from Seed,"* Juliet provides practical advice and time-tested techniques for novice and experienced herbalists alike to embrace the nuances of relationship with our ecology and how we can honor and respect the plants whose communities are threatened.

These heady titles belie the inspirational wordsmithing

therein—Juliet offers technical knowledge through the lens of her relationship with the plants, which always captures the beauty of the green world. Her voice makes clear the depth of her intimacy with the wild magic of plants and sparks a reminder of the humbling healing potential of the plant-human connection. With stunning videos and photos, her artistic eye brings each reader and student into the green world in a way rarely found alongside such practical scientific teachings.

Juliet's generous philanthropy-in-practice does not stop there. Her school sponsors restorative justice and ecological harmony in the plant world along with nine other organizations, such as One Million Redwoods Project, Organic Growers School, and Plants and Healers International (whose director, Marc Williams, was recipient of this award in 2016). In addition to promoting responsible plant stewardship, Juliet also supports the

herbalist community by continuously providing access to free educational resources, and also by awarding 8+ annual scholarships through non-profit partners, such as Grow Where You Are, Harriet's Apothecary, and Soul Fire Farm, as well as 90 enrollments to date through her own need-based diversity scholarship program.

Juliet founded the Chestnut School of Herbal Medicine in 2007 and serves as the school's primary instructor and Creative Director. She's been a professional plant-human matchmaker for close to three decades.

Juliet caught the plant bug when she was nineteen and went on to earn a degree in Botany. She's owned just

about every type of herbal business you can imagine: an herbal nursery, a medicinal products business, a clinical practice, and now, an herbal school.

These days, she channels her botanical obsession with writing and photography in her online programs and here on her personal blog, *Castanea*. She's writing her first book: *Cultivating Medicinal Herbs: Grow, Harvest, and Prepare Handcrafted Remedies from Your Home Garden*. Juliet and her houseplants share a home with her family and herb books in Asheville, North Carolina.

Her photographs, videos, and writings can be found at chestnutherbs.com, along with her school's Online Herbal Immersion Program—the most in-depth course available on cultivating medicinal herbs and at-risk medicinals. ■



Juliet Blankespoor, director and primary instructor of the Chestnut School of Herbal Medicine

LOOKING BACKWARDS... MOVING FORWARD

By Rosemary Gladstar

Founding President, United Plant Savers



Rosemary Gladstar, Kat Maier,
Susan Leopold at the International
Herb Symposium

I've just spent the afternoon reading the draft of the newest UpS Journal ~ the very one you have in your hands now. I was so impressed by the wide range of interesting articles that span the world and by the passionate voice UpS has become for the plants on a global scale. Where else would we find such

revealing and thought provoking information on popular herbs like White Sage, Hawaiian Sandalwood, Ginseng, Goldenseal ~ articles that share not only their medicinal uses and history, but how to use them judiciously, with conservation, not consumption, as the primary goal. I especially loved reading about our Sanctuary members and the good work they are doing in their local communities. I am inspired by how even the smallest plot of land can host such diversity, becoming a haven for pollinators as well as the pollinating ground for families, children and local communities to ignite their interest in medicinal plants, their importance, and their survival.

As we stand on the crest of United Plant Saver's 25th anniversary, I can't help reflecting back to our humble beginnings, how much we've accomplished, and how far we have yet to go.

United Plant Savers began simply, in a moment of inspiration with a small group of dedicated plant lovers. It was 1994. We met in one of the small dorm rooms at Wheaton College during the second International Herb Symposium. Each person I'd invited to join in that circle had a long and deep connection with the plant world and was involved in one way or another in an herbal business. Though we were all herbalists, our experiences and backgrounds were diverse ~ there were herbal practitioners, medicine makers, educators, seed savers, wild crafters, an herbal manufacturer and an herb farmer in the circle. While we were all excited to see the interest in herbs and herbalism burgeoning so quickly, we had growing concerns about where the plants were coming from. Who was growing these plants for the seemingly insatiable appetite of the herbal industry? Were they being cultivated or coming from the wild? And if so, what effect did wild harvesting have on these native plant populations? Did anyone even know?

Our small gathering that auspicious day at Wheaton College began with the questions; is there a problem with our wild medicinal plant populations? And if there is a problem, what are we going to do about it? As we sat crammed into that little room and talked late into

the afternoon, we realized we all had similar concerns; happy to see the interest in herbs growing, but alarmed at the extent that wild populations of medicinal plants were disappearing. It was a 'paw paw moment', one of those golden lushest moments when lives are about to change. This was the first opportunity that we had to talk with others who were sharing similar thoughts about our wild medicinal plants; and in our shared enthusiasm and optimism we decided on the spot we were ready to do something about it. We had no idea what that looked like or what would be involved. Or that it would require endless years of hard work, enduring dedication, unrelenting steadfastness, and an open heart. Nor did we realize at the time how rewarding the work would be, or how disappointing and frustrating, at times.

Early on we adopted as our mantra Margaret Meade's now famous quote, "Never doubt that a small group of thoughtful committed citizens can change the world. Indeed, it's the only thing that ever has." These became the guiding words and a source of inspiration for folks at United Plant Savers as we went about changing our small part of the world plant-by-plant, seed by seed, sanctuary by sanctuary. While there is always admittedly more work that needs to be done, I think we can be rather pleased about what a small group of thoughtful committed herbalists were able to accomplish in these past 25 years. We have hosted countless educational events on medicinal plant conservation throughout the U.S. and introduced medicinal plant conservation into the curriculum of most herb schools. We have written and printed numerous educational publications, including *Planting the Future*, which remains an important book on native plant conservation. Through a tremendous amount of creative effort we compiled a list of At Risk and To Watch Plants and a tool for assessing which plants are most vulnerable to over harvesting. UpS's *Journal of Medicinal Plant Conservation* has grown from a 16-page home printed newsletter to a full blown highly regarded publication. We have given away thousands of native medicinal plants and seeds for members to plant and have created a network of member owned UpS Botanical Sanctuary's that span the country. And, of course, there is our jewel, the United Plant Savers Botanical Sanctuary in South Eastern Ohio. This beautiful 350 acre plant rich Sanctuary is one of UpS's lasting treasures to plant lovers everywhere, a place where our children's children, and their children after them can come to see the native medicinal plants that in all good faith will be thriving for generations to come.

We've come a long way in the past 25 years, with a lot of work under our shovels, and there's still a long way to go in front of us. The work can get overwhelming and heartbreaking at times, but so long as we have good people willing to listen to the plants, to take a stand for them, and to give back even just a little of what the plant world gives to us, then we will be successful in our work. Never doubt what a small group of thoughtful committed impassioned plant lovers can do...we are replanting the world, plant by plant, seed by seed, sanctuary by sanctuary. ■

PARTNERS IN EDUCATION (PIE)

United Plant Savers Partners in Education program is designed to enrich school programming and students' education through instilling awareness and ethics in regards to the conservation of our native medicinal plants. Schools and apprenticeship programs that have enrolled in the Partners in Education program have provided their students the opportunity to receive all of the benefits of membership at a discounted 'student-friendly' price. These schools and programs are also given educational resources and

curricular support as well as provided the opportunity to promote classes and workshops on our website and social media channels. For more information about our Partners in Education program, please visit our website: www.unitedplantsavers.org. United Plant Savers holds a special place in our heart for our Partners in Education Schools and would like to **thank the following participating 2018-2019 schools and programs:**

Appalachian Ohio School of Herbal Medicine

Rutland, OH
herbsheal.com

ArborVitae School of Traditional Herbalism

New York, NY
arborvitaeny.com

Bastyr University Herbal Sciences

Kenmore, WA
bastyr.edu

Blazing Star Herbal School

Ashfield, MA
blazingstarherbalschool.typepad.com

Blue Otter School of Herbal Medicine

Fort Jones, CA
blueotterschool.com

Botanica

New River, AZ

Chestnut School of Herbal Medicine

Weaverville, NC
chestnutherbs.com

Dandelion Herbal Center

Kneeland, CA
dandelionherb.com

Florida School of Holistic Living

Orlando, FL
holisticlivingschool.org

Green Comfort School of Herbal Medicine

Washington, VA
greencomfortherbschool.com

Green Girl Herbs and Healing

Hopewell, NY
greengirlherbs.com

Green Turtle Botanicals

Nashville, TN
greenturtlebotaniclas.com

Greenwood Herbals

Limerick, ME
greenwoodherbals.com

Herb Pharm

Williams, OR
herb-pharm.com/connect/internship

Herbal Academy of New England

Bedford, MA
herbalacademyofne.com

Herbal Sage Tea

Pomeroy, OH
herbalsage.com

Heartstone Herbal School

Van Etten, NY
heart-stone.com

Jean's Greens

Castleton, NY
jeansgreens.com

Luna Farm Herbal Gardens and Botanical Sanctuary

Troy, IL
lunaherbco.com

Magnolia School

Glouster, OH

Maryland School of Integrative Health

Laurel, MD
muih.edu

Milagro University of Herbal Medicine

Orlando, FL
milagroschoolofherbalmedicine.com

Mockingbird Meadows Eclectic Herbal Institute

Marysville, OH
mockingbirdmeadows.com

Moonwise Herbs

Stoughton, WI
moonwiseherbs.com

Northwest School of Botanical Studies

McKinleyville, CA
herbaleducation.net

Omnigreen

Port Clinton, OH
omnigreen.com

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owlcrafthealingways.com

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purplemoonherbstudies.com

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theresiliencyinstitute.net

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sacredplanttraditions.com

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sagemountain.com

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thymeherbal.com

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vtherbcenter.org

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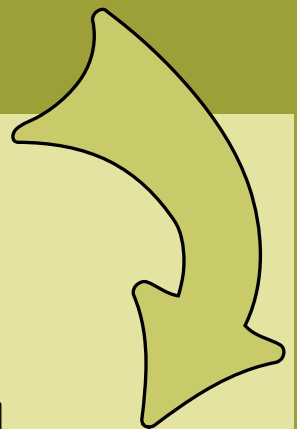
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