Ethnobotany

Definition and Scope: Ethnobotany is the interdisciplinary study of how people of different cultures use plants. It examines the traditional knowledge of plant uses for food, medicine, shelter, dyes, fibers, oils, resins, and cultural practices fs.usda.gov . In practice, ethnobotanists document vernacular plant names, parts used, modes of preparation, and ecological context. The field bridges botany with anthropology, linguistics and pharmacology, seeking to record indigenous knowledge before it is lost. Plants often serve multiple roles in a society, so ethnobotany covers not only material uses but also spiritual and symbolic meanings fs.usda.gov . For example, the U.S. Forest Service notes that "ethnobotany is the study of how people of a particular culture and region make use of indigenous plants," including food and medicine, and even ceremonial or spiritual uses of plants fs.usda.gov . Ethnobotany thus encompasses historical, cultural and ecological dimensions of human–plant relationships.

Historical Development and Key Figures: Ethnobotanical knowledge is ancient (Dioscorides's *De Materia Medica* in ~AD 50 documented hundreds of Mediterranean plants), but the discipline emerged in modern science around the turn of the 20th century. The term *ethnobotany* was introduced by botanist John W. Harshberger in 1895 (in reference to studying plants used by local peoples), and the field grew through explorations of colonial and indigenous knowledge in the 18th–19th centuries. European explorers and naturalists (e.g. Linnaeus's student Pehr Kalm among North American Indians, Humboldt in Latin America) recorded many new plant uses. In the early 20th century, **Richard Evans Schultes** (1915–2001) transformed ethnobotany by living among Amazonian tribes and systematically collecting medicinal plants. Richard Schultes (center in image) is often called the *"father of ethnobotany"* news.tulane.edu . He and his students (including Mark Plotkin) documented hundreds of plant remedies; Plotkin famously noted that "every single useful plant that's come out of the rainforest was first learned from indigenous peoples" news.tulane.edu . (Schultes's legacy also inspired later figures such as ethnobotanists Nancy Turner, Michael Balick and Paul Cox.) Ethnobotany continued expanding through the 20th century with university programs and botanical gardens, linking anthropologists and botanists. By the late 20th century it became a recognized science informing ecology and medicine.

Richard E. Schultes (center) in the Amazon; often called the "father of ethnobotany" for his pioneering studies of indigenous plant knowledge news.tulane.edu .

Core Methodologies: Ethnobotanical research is mainly field-based, relying on direct collaboration with local communities. Common methods include **participant observation** (joining local plant-gathering and healing practices), **interviews and questionnaires** with traditional healers and elders, and **focus groups or guided walks** to elicit plant uses. Researchers record vernacular names, plant parts, preparation methods and contexts of use. Voucher specimens are collected for scientific identification. Data are often quantified using indices (e.g. use-value scores, informant consensus factors) to rank important species. Modern studies increasingly use **participatory approaches**: for example, Rodrigues et al. (2020) describe training local partners in Brazil to collect ethnobotanical data and map useful plants in their forests ethnobiomed.biomedcentral.com . In that study, community members interviewed knowledgeable elders and used participatory GIS mapping to locate plants of high conservation priority ethnobiomed.biomedcentral.com .

Ethnobotanists also employ interdisciplinary tools. **Geographic Information Systems (GIS)** and ecological surveys can map plant distributions and correlate them with cultural practices. **Molecular methods** are now used: for instance, DNA barcoding ("ethnobotany genomics") can verify the identity of plants known by indigenous classification. Newmaster et al. (2010) showed that DNA barcoding confirmed several cryptic plant species already distinguished by traditional healers in India, validating local taxonomy and revealing new species ethnobiomed.biomedcentral.com . Ethnobotanical research may also involve laboratory phytochemistry and pharmacology when testing plants for biological activity. In summary, ethnobotanists blend social-science interviews with botanical fieldwork and, increasingly, modern genetic and analytical techniques to link traditional knowledge with scientific classification ethnobiomed.biomedcentral.com ethnobiomed.biomedcentral.com .

Significance of Ethnobotany

Cultural Significance

Plants carry deep cultural meanings. Many societies use particular plants in rituals, festivals or as symbols of identity. For example, the *Ajo macho* bulbs shown (Allium species) are used as good-luck charms and medicinal charms in parts of Mexico commons.wikimedia.org . More broadly, ethnobotany reveals how plant use is woven into customs, language and art. Songs, myths

and taboos often center on culturally important plants. As a U.S. Forest Service primer notes, "many native peoples also use plants in ceremonial or spiritual rituals" fs.usda.gov , and these sacred uses are documented by ethnobotanists. Traditional ecological knowledge often includes ethnobotanical lore about seasonal plant spirits, planting ceremonies or sacred groves. By recording this knowledge, ethnobotanists help preserve cultural heritage: for example, field guides and storybooks produced with communities (as in Rodrigues et al. 2020) serve both education and cultural revitalization ethnobiomed.biomedcentral.com .

Ecological Significance

Traditional plant knowledge often embodies ecological understanding. Indigenous practices of harvesting and land management (such as crop rotation, agroforestry, or controlled burning) frequently promote ecosystem health and biodiversity. Ethnobotanical information can identify **key species** in an ecosystem and how they are used or managed. For instance, when Rodríguez et al. surveyed Brazilian forest communities, they identified dozens of native trees (like *Virola bicuhyba* and *Cedrela fissilis*) that locals depend on and that are now threatened ethnobiomed.biomedcentral.com . Linking plant-use data to conservation indices helps prioritize these species for protection. Ethnobotany also contributes to **sustainable management**: knowledge of seasonal cycles and soil preferences, passed down through generations, informs sustainable harvesting. As Mark Plotkin emphasizes, protecting "the forest and the knowledge and way of life of indigenous and local cultures" is crucial for ecological sustainability news.tulane.edu . By integrating indigenous practices (e.g. polyculture farming, seed saving, sacred groves), conservationists can design bioculturally inclusive strategies.

Medicinal Significance

One of ethnobotany's most celebrated contributions is identifying medicinal plants and compounds. Healers worldwide have long used plants for healing, and many modern pharmaceuticals trace back to these uses. As Tulane ethnobotanist Mark Plotkin observes, knowledge of medicinal plants "has been passed down for thousands of years by native healers worldwide," and science often finds that "plants and other organisms hold solutions to numerous human medical problems" news.tulane.edu . Classic examples abound:

- **Quinine (anti-malarial):** Andean peoples (e.g. Quechua, Chimú) had long used *Cinchona* bark to treat fevers before Europeans arrived. Jesuit missionaries learned of its feverreducing effects from indigenous healers; quinine was later isolated from *Cinchona*

in the 19th century. Today it remains a key antimalarial drug. As a BBC report notes, "quinine was already known to the Quechua, Cañari and Chimú indigenous peoples… before the arrival of the Spanish" bbc.com .

- **Artemisinin (malaria drug):** The discovery of artemisinin came from Chinese traditional medicine. Ancient Chinese texts (circa 4th century AD) recommended sweet wormwood (*Artemisia annua*) for treating fever. Researcher Tu Youyou searched these texts during the 1960s and isolated artemisinin, now a first-line antimalarial. The Nobel Prize committee calls artemisinin "a gift from traditional Chinese medicine," tracing it back to remedies for fever recorded in 4th-century text nobelprize.org .
- **Aspirin (pain reliever):** Aspirin's roots lie in the folk use of willow bark. Ancient Egyptians and Greeks (Hippocrates) recommended willow bark for pain relief bbc.com . In 1763 a scientific study confirmed its effectiveness, and in 1897 chemists derived salicylic acid (the active ingredient) from willow. By 1915 Bayer was marketing acetylsalicylic acid as aspirin. Today aspirin remains one of the most widely used drugs.
- **Other drugs:** Many other drugs have ethnobotanical origins. For example, galantamine (for Alzheimer's) comes from the snowdrop bulb, a plant long used in Bulgarian folk medicine bbc.com . Cancer drugs like vinblastine and vincristine were discovered in Madagascar periwinkle (*Catharanthus roseus*), traditionally used in Ayurveda for diabetes. The sedative kava comes from a Polynesian pepper plant (*Piper methysticum*) used by Pacific Islanders.

These examples illustrate how traditional plant remedies have global importance. By studying indigenous remedies, ethnobotanists continue to find leads for new medicines (for cancer, infections, neurological diseases, etc.). In many cases, modern pharmacology confirms the efficacy of traditional uses, validating ethnobotanical knowledge as a guide to bioactive compounds.

Ethnobotanical Discoveries and Case Studies

Prominent case studies highlight ethnobotany's impact across cultures. For example:

- **Cinchona (South America):** The Quechua and other Andean peoples used *Cinchona* bark as a fever remedy long before Europeans arrived. Jesuit missionaries called it "Jesuit's powder" when treating malaria in 17th-century Peru. Modern analysis shows those indigenous groups knew quinine's antimalarial effect; as a BBC account notes,

"quinine was already known to the Quechua, the Cañari and the Chimú indigenous peoples… before the arrival of the Spanish" bbc.com .

- **Artemisia annua (China):** *Artemisia annua* (sweet wormwood) was used in Chinese traditional medicine for over a millennium to treat fevers. In the 1970s, researchers screened old Chinese herbals and confirmed that artemisinin, a compound from this plant, is highly effective against malaria. This led to lifesaving therapies and won Tu Youyou the 2015 Nobel Prize nobelprize.org .
- **Willow bark → Aspirin (Middle East/Europe):** Willow trees were tapped for fever and pain relief by ancient civilizations. Hippocrates noted willow bark's salicylic effects, and by the 19th century chemists isolated its active ingredient. Today's aspirin tablets are direct descendants of those ethnobotanical remedies bbc.com .
- **Hoodia (Southern Africa):** The San people of the Kalahari desert traditionally chewed the succulent *Hoodia gordonii* to suppress hunger during long hunts. This indigenous use became widely known in the late 20th century when researchers identified a natural appetite-suppressant molecule (P57) in Hoodia nccih.nih.gov . Though commercial development of Hoodia for weight loss has been controversial, it exemplifies how ethnobotany can draw on tribal knowledge for novel pharmaceuticals.

These examples (and many others) show that ethnobotanical leads span continents and eras. Whether through formal collaboration or chance discovery, modern science has validated numerous traditional remedies. The cumulative case studies also underscore the importance of preserving indigenous knowledge, as future cures and crops may yet be hidden in these traditions.

Ethical Considerations and Challenges

Ethnobotanical research raises significant ethical issues. Researchers work with **sensitive traditional knowledge** held by Indigenous and local communities, so obtaining free, prior and informed consent is crucial. The International Society of Ethnobiology's Code of Ethics stresses that past research "without the consent of Indigenous peoples" caused harm, and it calls on scientists to respect Indigenous intellectual property and community rights ethnobiology.net . In practice, this means sharing benefits: for example, traditional healers who

reveal plant remedies should receive recognition or material benefits (joint authorship on papers, a share of any profits, or community development support) rather than seeing their knowledge appropriated.

International legal frameworks also govern ethnobotany. Under the Convention on Biological Diversity and the Nagoya Protocol (2010), nations and communities have sovereign rights over their genetic resources and traditional knowledge. Ethnobotanists must comply with access-and-benefit-sharing regulations: obtaining permission from local authorities and negotiating fair terms before collecting plants or data. However, implementation is uneven. Experts Paniagua-Zambrana and Bussmann note that even after Nagoya's ratification, indigenous participation in ethnobiological research "often is still fragmentary" nature.com . They argue that scientists should train local community members as co-researchers so they can conduct interviews and share in analysis and publication nature.com .

Other challenges include **biopiracy** (unauthorized patents on traditional plants), loss of knowledge (as elders pass away or cultures change), and cultural sensitivities (some plants are sacred or secret). Ethnobotanists must navigate these carefully, often with institutional ethics review boards. Codes of conduct emphasize collaboration: one should "support community-driven development… acknowledge Indigenous cultural and intellectual property rights… and contribute to positive, beneficial… relationships" ethnobiology.net . Balancing scientific goals with respect for cultural values and legal requirements remains a central, ongoing concern in the field.

Current Trends, Innovations, and Interdisciplinary Approaches

Ethnobotany today is a dynamic, high-tech field that intersects many disciplines. Advances in molecular biology and informatics are changing how ethnobotanists work. The "ethnobotany genomics" approach (Newmaster & Ragupathy 2010) integrates DNA barcoding with traditional classification: by genetically identifying specimens that local healers recognize as distinct, researchers both validate indigenous taxonomies and discover cryptic species ethnobiomed.biomedcentral.com . Big-data and **digital ethnobotany** are emerging: databases of ethnomedicinal plants (incorporating GIS mapping and mobile apps) enable global comparisons of plant use. Citizen science is another innovation: for example, botanical gardens have run projects in which the public documents local plant uses. Mulhauser & Gaille (2024) describe how volunteers in a botanical garden helped compile worldwide

recipes and stories for medicinal plants, illustrating that "citizen science" can enrich ethnobotanical knowledge by engaging diverse communities link.springer.com .

Interdisciplinary collaboration is now routine. Ethnobotany overlaps with **ethnopharmacology** (lab screening of traditional medicines), **conservation biology** (identifying culturally important species for protection), and **linguistics/anthropology** (studying plant names and symbolism). For instance, ethnobotanists might work with ecologists to model how climate change affects the habitats of sacred plants, or with public health experts to study how traditional diets contribute to nutrition. The field also responds to global challenges: after the COVID-19 pandemic began, many ethnobiologists argued that traditional remedies and ecological knowledge should inform resilience strategies. They even dubbed ethnobiology (and ethnobotany) the *"science of survival"* nature.com because it helps humanity cope with biodiversity loss and health threats.

In sum, modern ethnobotany blends field anthropology with genomics, analytics, and even art: photographic herbariums, cultural mapping, and ethnographic writing all contribute. It increasingly values **participatory methods** – as in the Brazil quilombola study ethnobiomed.biomedcentral.com – and public engagement link.springer.com . The trend is toward holistic, inclusive research that leverages technology (genetics, GIS, apps) while remaining rooted in community collaboration. This interdisciplinary richness holds promise for novel discoveries and for addressing environmental and health crises.

Future Directions and Sustainability

Looking ahead, ethnobotany's role in sustainability and conservation is expected to grow. Experts emphasize that preserving and integrating traditional plant knowledge is essential for a resilient future. For example, the Nature Plants editorial notes that ethnobiology (including ethnobotany) is uniquely positioned to help "feed and self-medicate an increasing world population" under climate change nature.com . The world's population is projected to reach ~9.7 billion by 2050, and ethnobotanical science can guide sustainable agriculture (by identifying drought-tolerant crops or lost wild relatives) and new medicines from local flora. Ethnobiologists argue that traditional ecological knowledge is key to maintaining the "biosphere and ethnosphere" – the intertwined web of life and cultural diversity nature.com .

Conservationists are also recognizing **biocultural diversity** as a priority: protecting ecosystems in tandem with the cultures that steward them. Ethnobotany contributes by documenting *cultural keystone species* (plants vital to a community's identity) and by validating indigenous conservation practices (like sacred groves or seed banks). Policies such as the UN Decade on Biodiversity and UN Sustainable Development Goals now explicitly call for using indigenous knowledge in conservation and health. Ethnobotanists will likely work more with policy-makers and NGOs to ensure plant resources are managed sustainably.

Future research trends include **climate change ethnobotany** (studying how shifting conditions affect useful plants and how communities adapt their practices) and **genetic conservation** (using traditional knowledge to prioritize gene banks of heirloom crops). New innovations may involve AI to analyze large ethnobotanical corpora or drones to survey medicinal plant populations. But whatever the technology, the core mission remains: ethnobotany will be crucial for sustainability and conservation by linking cultural wisdom with ecological science. As one editorial notes, ethnobotany's focus on the "interconnectedness of all life" is more important than ever news.tulane.edu . In the future, ethnobotanists will likely serve as key collaborators in biocultural conservation projects, helping to safeguard both plant biodiversity and the human traditions that depend on it.

Sources: Authoritative botanical and ethnographic literature and institutional resources have been used in this overview. For example, USDA Forest Service publications define ethnobotany's scope fs.usda.gov ; peer-reviewed journals (e.g. *Journal of Ethnobiology and Ethnomedicine*) report on DNA barcoding methods ethnobiomed.biomedcentral.com and participatory studies ethnobiomed.biomedcentral.com ; and reputable news and academic sources document discoveries (e.g. BBC on quinine bbc.com and aspirin bbc.com , Nobel Prize profile on artemisinin nobelprize.org , NIH on Hoodia nccih.nih.gov). These and other studies and resources have been cited above.

Citas

Ethnobotany
https://www.fs.usda.gov/wildflowers/ethnobotany/index.shtml

Indigenous knowledge key to healthier global future, ethnobotanist says | Tulane U… https://news.tulane.edu/news/indigenous-knowledge-key-healthier-global-future-ethnobotanist-says

Indigenous knowledge key to healthier global future, ethnobotanist says | Tulane U... https://news.tulane.edu/news/indigenous-knowledge-key-healthier-global-future-ethnobotanist-says

Participatory ethnobotany and conservation: a methodological case study conducte... https://ethnobiomed.biomedcentral.com/articles/10.1186/s13002-019-0352-x

Ethnobotany genomics - discovery and innovation in a new era of exploratory rese... https://ethnobiomed.biomedcentral.com/articles/10.1186/1746-4269-6-2

File:Ajo macho.jpg - Wikimedia Commons
https://commons.wikimedia.org/wiki/File:Ajo_macho.jpg

Participatory ethnobotany and conservation: a methodological case study conducte... https://ethnobiomed.biomedcentral.com/articles/10.1186/s13002-019-0352-x

Indigenous knowledge key to healthier global future, ethnobotanist says | Tulane U... https://news.tulane.edu/news/indigenous-knowledge-key-healthier-global-future-ethnobotanist-says

Indigenous knowledge key to healthier global future, ethnobotanist says | Tulane U... https://news.tulane.edu/news/indigenous-knowledge-key-healthier-global-future-ethnobotanist-says

The tree that changed the world map https://www.bbc.com/travel/article/20200527-the-tree-that-changed-the-world-map

TU YOUYOU - NobelPrize.org https://www.nobelprize.org/stories/women-who-changed-science/tu-youyou

Five old remedies that are still healing us today - BBC News
https://www.bbc.com/news/health-34616695

Five old remedies that are still healing us today - BBC News
https://www.bbc.com/news/health-34616695

Hoodia: Usefulness and Safety | NCCIH

https://www.nccih.nih.gov/health/hoodia

The ISE Code of Ethics - International Society of Ethnobiology
https://www.ethnobiology.net/what-we-do/core-programs/ise-ethics-program/code-of-ethics/

Reshaping the future of ethnobiology research after the COVID-19 pandemic | Natu... https://www.nature.com/articles/s41477-020-0691-6?error=cookies_not_supported&code=925fdea1-698f-4fdc-b83a-66fe41bee7db

How Can Citizen Science in a Botanical Garden Enrich the Discipline of Ethnobotany... https://link.springer.com/article/10.1007/s12231-024-09606-0

Reshaping the future of ethnobiology research after the COVID-19 pandemic | Natu... https://www.nature.com/articles/s41477-020-0691-6?error=cookies_not_supported&code=925fdea1-698f-4fdc-b83a-66fe41bee7db

Reshaping the future of ethnobiology research after the COVID-19 pandemic | Natu... https://www.nature.com/articles/s41477-020-0691-6?error=cookies_not_supported&code=925fdea1-698f-4fdc-b83a-66fe41bee7db

Indigenous knowledge key to healthier global future, ethnobotanist says | Tulane U... https://news.tulane.edu/news/indigenous-knowledge-key-healthier-global-future-ethnobotanist-says

Todas las fuentes

fs.usda news.tulane ethnobio...edcentral commons.wikimedia bbc

nobelprize nccih.nih ethnobiology nature link.springer