



Ethnobotany Education, Opportunities, and Needs in the U.S.

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Abstract

There is more interest in ethnobotany today, than at any time in the discipline's history. Ethnobotany, however, suffers from many deficiencies, especially the lack of research support, educational opportunities, and a theoretical basis. Ethnobotanists should expand the definition of ethnobotany to include all plant-people interactions, not just those of traditional societies. They also must integrate more effectively with colleagues in related disciplines and promote ethnobotany's relevance to Introductory Botany and other courses. Ethnobotany and ethnobiology are natural links to conservation biology, resource management, and environmental education. An undergraduate ethnobotany track could provide ideal training for medicine. To be competitive, prospective students need to prepare better for graduate school. They should have a firm foundation in the botanical and anthropological sciences, as a minimum. If ethnobotany is to become a mature discipline, it must develop a theoretical framework while not abandoning its descriptive history. Expanding ethnobotany's scope to include all plant and human interactions greatly increases the funding, research, and job opportunities for the discipline. More importantly, there is no compelling intellectual argument for restricting ethnobotany's reach to traditional cultures.

The Problems

A little more than a century since it adopted its present name, there is more interest in ethnobotany than at any time in its history. Yet, ethnobotany suffers from many deficiencies, especially a paucity of funding and educational opportunities. During the Building Bridges II Education Workshop (1 June 2001), students, faculty, and others expressed these and other concerns. Here, I address the status of education, funding, and employment in the field of ethnobotany and another threat to the discipline --- the

lack of a theoretical orientation. I also offer suggestions for addressing these problems.

Graduate Education

Most prospective graduate students face a daunting task—condensing the list of potential graduate schools down to a manageable number. The aspiring ethnobotanist has a much simpler charge. There are only a handful of active ethnobotany programs in the United States (McClatchey *et al.* 1999). While it is an easy assignment to identify and evaluate these programs, prospective students face intense competition for admittance, since the applicant pool is far larger than the total number of openings each year. The process discourages many graduating seniors and even the most highly qualified students often find no graduate opportunities in their chosen field.

From the perspective of ethnobotany faculty, it is both an exciting and frustrating era. While many of our university colleagues hustle to recruit a student or two, ethnobotanists in academia have the difficult job of selecting among the many highly qualified students who often rank

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among the top applicants. The downside is that we must turn down many qualified students, an unpleasant but common chore. Another vexation for ethnobotany faculty is the large number of applicants who lack either qualifications or realistic expectations. Jacques Cousteau inspired thousands to consider careers in oceanography. A generation later, the Indiana Jones series ignited interest in archaeology. Medicine Man and Tales of a Shaman's Apprentice kindled a similar surge in ethnobotany's popularity. But just as Indy and Jacques revealed little of the true nature of their disciplines, increased media exposure seldom portrays the real character of ethnobotany.

In stark contrast to the ersatz excitement portrayed in popular literature, the words of Claude Levi-Strauss are as applicable to ethnobotany as they are to his discipline, "Adventure has no place in the anthropologist's profession; it is merely one of those unavoidable drawbacks, which detract from the effective work through the incidental loss of weeks or months." Occasionally, the popular media succeeds. In his book, *Earthly Goods: Medicine Hunting in the Rainforest*, Christopher Joyce (1994) succinctly and accurately describes the discipline. "The ethnobotanist spends half his time amid the sacred, trying to separate mumbo jumbo from ancient if primitive genius, and the other half amid the profane, looking down the barrel of a microscope and deciphering the code of taxa, alkaloids, symbiotes, and the ephemera of ecology."

There is nothing inherently wrong with popularization. Greater public awareness fosters greater support for the discipline and attracts student interest. The problem is that many prospective students develop a quixotic idea about the nature of ethnobotany. During fieldwork, the romance of *Dancing with Wolves* quickly is supplanted by the reality of *Foxtrotting with Fever* and *Quickstepping with Quinine*. Ethnobotanical fieldwork can be exhilarating, but it also is characterized by physical discomfort and punctuated by drudgery. Christiane Ehringhaus, a former student, accurately articulated the nature of research. After returning from a five-month expedition with the Kaxinawá in Brazil, she described the experience as being "always lonely but never alone."

Research Opportunities

Since the early 1990s, conducting ethnobotanical research in developing countries has become increasingly difficult. This is due, in large part, to paranoia about traditional knowledge and intellectual property rights. To be sure, there have been horrific cases, such as the attempt to patent ayahuasca. In 1986, the United States Patent and Trademark Office (PTO) issued Plant Patent No. 5,751 to Loren Miller for a purported unique variety of the hallucinogenic vine ayahuasca (*Banisteriopsis caapi*). The patent generated vociferous and acrimonious protests from the Coordinating Body of Indigenous Organizations of the Amazon and other groups. In 1999, PTO

rejected Miller's patent, which he had dubbed "Da Vine" (Anonymous 1999). Ayahuasca, a ubiquitous element in most cultures from northwestern Amazonia (Bennett 1992a,b; Bennett and Alarcón 1994), was widely known prior to the patent application (Anonymous 1999). For that reason alone, it did not warrant a patent. Repercussions of the patent attempt, nonetheless, were serious. In 1996, Acción Ecológica, an Ecuadorian NGO, thwarted ratification of a bilateral IPR agreement between Ecuador and the U.S. due, in part, to the ayahuasca fiasco (Wateringen 1997). Fear of future patent efforts have made it much more difficult for legitimate researchers to collect and export plant material.

Most ethnobotanists also share some of the blame. Many of us argued for increased ethnobotanical funding so that we could discover the hidden marvels of the rainforests. Of course, these marvels really weren't "undiscovered" but rather they represent the composite knowledge that rainforest dwellers accumulated over the millennia. The ethnobotanical leads would generate new drugs, which would foster support for forest conservation or so we argued. The success of ethnobotany in discovering new drugs, however, has proven to be limited. With the exception of a few new leads (e.g., prostratin an antiviral compound from the Samoan plant *Homolanthus nutans*, Cox 2000), there has been little to show for a decade of bioprospecting. In part, the lack of success has been due to misdirected efforts. Yet, despite the few successes, the hype and paranoia remains. Cultures and forests continue to disappear, while academicians and politicians squabble over the ownership of biological resources. One author notes, "... traditionally, bioprospecting in developing countries has been the preserve of field researchers in universities and botanical gardens. ... These small-scale activities added little value to the biodiversity resource and in any case, are now likely to be discouraged by national legislation implementing the CBD [Convention on Biological Diversity]" Anonymous (2001). It is like a cherished library that is afire. Instead of extinguishing the flames, we argue about who are the legitimate firefighters.

Funding

A common complaint from students is the lack of research funding for ethnobotanical research, but students are not the only ones to suffer from the paucity of support. Because of its interdisciplinary nature, ethnobotany does not readily fit funding categories of national agencies or private foundations. The National Science Foundation funds botanical research mostly through the Directorate for Biological Sciences. The Directorate's Division of Environmental Biology (DEB) "supports fundamental research on the origins, functions, relationships, interactions, and evolutionary history of populations, species, communities, and ecosystems. Scientific emphases include biodiversity, molecular genetic and genomic evolution, mesoscale ecology, conservation biology, global change, and resto-

ration ecology.” Anthropology, archeology, and geology are supported through the Directorate for Social, Behavioral & Economic Sciences.

The term “ethnobotany” is not found in key words listed from either directorate and a search of the entire NSF website yielded only two hits for ethnobotany (see www.nsf.gov). Only one of these represented a funded grant – a paltry \$9,000. In contrast searches for the following related terms were much more productive (Table 1). The only key word that generated fewer hits than ethnobotany was Phytochemistry, an important complementary discipline.

Table 1. Number of hits for selected key words on the National Science Foundation website. (www.nsf.gov on 27 Mar 2001)	
Key Words	Number of Hits
Archaeology	229
Conservation	1179
Ecology	2396
Ethnobotany	2
Evolution	909
Geography	2250
Phytochemistry	1
Restoration	360

Employment

In the past 10 years, there have been no more than a handful of new ethnobotanical jobs at the PhD. level. Nonetheless, ethnobotanists have found jobs. They are hired by conservation NGOs, development organizations, and botanical gardens. Universities also have hired ethnobotanists to fill positions in conservation biology, environmental studies, systematics, and related fields. Yet, most colleges meet the huge student demand for ethnobotany through visiting lecturer and adjunct positions. New lines for ethnobotany in academia are likely to remain rare.

Theory

“I want to study the Maya.” “I hope to work in Samoa.” “I am interested in Solanaceae.” Too often, these are the first kinds of questions posed by students. Research should be question-driven and theoretically oriented. After identifying a research question, the investigator can select a culture, a place, or a taxon to answer the question. How has Mayan cosmology affected the Maya’s relationship with the environment? How does insularity influence Samoan plant use? Why is the Solanaceae important in most every culture?

Ethnobotany is largely bereft of theory. With the exception of Brent Berlin’s (1992) work on folk taxonomy and Tim Johns’ (1990) chemical ecology approach to medicine and food plants, ethnobotany is essentially descriptive. Davis (1995) accurately notes that, “... ethnobotany has at times suffered from a lack of orientation and integration, and its traditional task of cataloging the use of plants has been criticized as lacking theoretical content.” Too often the battle is framed as description versus theory, but this is contrasting apples and oranges. Just as ecological research requires a basic knowledge of the flora and fauna, ethnobotanical work first requires knowledge of the plants that people use. The descriptive part of ethnobotany is crucial. On the other hand, collection of data is down with-out a theoretical framework.

Solutions

Expanding Ethnobotany’s Scope

Acculturation, loss of indigenous languages, and forest conversion threaten the fate of ethnobotany, at least as the subject is defined by many and is portrayed in the popular media. Most think of ethnobotany as the study of plant use by indigenous or traditional peoples (e.g., Harshberger 1896, Jones 1941, Schultes 1992, Schultes and von Reis 1995, and Cotton 1996). Ford (1978) acknowledges that human-plant interactions are universal, when he discusses the distinction between ethnobotany and economic botany, “... by restricting a definition ... , we may miss an important contribution of ethnobotany toward understanding a particular society, including our own.” More recent definitions of the subject do not limit ethnobotany’s scope to any one social or economic class (e.g., Turner 1995 and Balick and Cox 1996).

Why is ethnobotany so important? The answer is found in every elementary ecology text. Examine an energy pyramid. Plants form the base on which all higher trophic levels, including humans, depend. In the words of C. Earle Smith (1995), “Ethnobotany is the sum of human subsistence knowledge.” As such it is one of the most integral and important disciplines.

It is the job of ethnobotanists to become passionate advocates for the discipline. We must actively promote the importance and relevance of our discipline. Ethnobotany is not limited to the study of traditional people in remote regions of the world. Rather, it embraces all human-plant interaction. The ability to work with indigenous peoples is fast disappearing but the relationship between plants and humans is timeless. Lincoln Constance (1957) asserted that, “plant taxonomy has not outlived its usefulness: it is just getting under way on an attractively infinite task.” The same is true of ethnobotany.

By expanding the definition of ethnobotany, we create more opportunities for research, funding, and employment. For example, the field of urban ethnobotany is rapidly developing (Balick *et al.* 2000). We also should better integrate ethnobotany with related disciplines. Ethnobotany and ethnobiology are natural links to conservation biology, resource management, and environmental education. A recent epidemiological study in southern Florida examined the relationship between fish consumption and mercury accumulation in humans. The results were likely to be more clear-cut had an ethnobiological approach been taken. Several ethnic groups fish in the Everglades: Hispanics, Non-hispanic whites, Afro-Americans, Afro-Caribbeans, and Native Americans. Each group targets fish species of different trophic levels and consumption varies among the groups. Recreational anglers may not consume fish at all. Others fish for subsistence. A better consideration of ethnology and ecology would have produced better results. Ethnobotany and ecology also have much in common. Publications by Clark (1996) and Janzen (1998) make compelling arguments for the ubiquitous influence of humans on the landscape.

Medicine and Botany

One field that is particularly appropriate for integration is medicine, which today seems to have little in common with ethnobotany. Yet, many famous names in medicine are well known to botanists as well. In fact, the two disciplines were intimately linked through much of their history. Now they seem as different as astrophysics and sociology. What happened? In reviewing an obscure text, *Catalogue of Portraits of Naturalists, Mostly Botanists, E-H* (Karg *et al.* 1999), I came across intriguing data. Of the approximately 3,400 entries, the occupations of 145 (4.3%) were listed as both medicine and botany (Table 2). Germany and Austria were especially prolific in training physicians/botanists until 1800 (Table 3). By the mid to late 1800s, the number of people trained in both disciplines had decreased significantly (Table 4). What happened? I suspect it was the rise of synthetic organic chemistry. No longer was nature the sole source of medicines.

1. Eighty percent of the world's population depends on plants as their main source of medicine (Plotkin 2000).
2. Twenty-five percent of U.S. prescriptions issued from 1959-1973 contained one or more active components derived from higher plants (Farnsworth & Soejarto 1985).
3. Ninety plant species provide 120 therapeutic agents for commercial pharmaceuticals (Farnsworth *et al.* 1985).
4. The National Cancer Institute has identified 3,000 plants active against cancer cells (Cragg *et al.* 1997).
5. One third of the U.S. population spends at least \$3.5 billion on herbal medicines each year (Canedy 1998, Tyler 1996)

6. Use of herbal medicines in the U.S. increased 380% from 1990 to 1997 (Eisenberg *et al.* 1998).

Table 2. Number of Physician/Botanists (PB) by period. Obs=observed. Exp=expected, based on a random distribution.

Period	Obs PB	Exp PB	Obs - Exp PB
<1750	50	7	43
1750 – 1774	9	2	7
1775 – 1799	16	3	13
1800 – 1824	22	12	10
1825 – 1849	18	13	5
1850 – 1876	20	12	8
1875 – 1899	4	25	-21
1900 – 1924	6	42	-36
1925 – 1949	0	25	-25
> 1950	0	4	-4
Total	145	145	145

Table 3. Place of Birth of Physician/Botanists until 1800.

Place of Birth	Number of Physician/Botanists
Germany/Austria	41
England/Scotland	21
France	18
USA	17
Italy	12
Switzerland	11
Other	25
Total	145

Table 4. Date of monotonic deficit in the number of physician botanists (i.e., fewer number than expected by a random distribution) by place of birth.

Place of Birth	Decade
Switzerland	1750
Germany/Austria	1800
Italy	1825
England/Scotland	1875
France	1875
Other	1875
USA	1925

Does botany have any relevance to medicine today? Consider the following:

Clearly, ethnobotany has not outlived its usefulness. Rather, we need to reintegrate ethnobotany and medicine. A carefully crafted ethnobotany track would provide ideal training for medicine, both at the graduate and undergraduate level. The skills of a successful ethnobotanist are the same as those of a good physician --- knowledge of biology and chemistry and the ability to listen across cultural boundaries. One need only scan the literature to find new and exciting discoveries from plants (e.g., Kapadia *et al.* 2002).

Graduate Education

Most ethnobotany graduate programs are in one of two disciplines --- biology or anthropology. Prospective students must first decide which discipline is most aligned with their graduate interests. Typically, biology graduate programs are less flexible in their entrance requirements. Combined with the scarcity of ethnobotany programs in biology departments, many prospective students will not find a slot in graduate school. The solution is obvious---we must create more opportunities. How we do this is another question.

A short-term solution is to provide more field courses. Many students conduct ethnobotanical research at universities where there is no formal program in the discipline. This requires understanding faculty mentors, who allow students to straddle the line between traditionally defined academic disciplines. To complement their training, these students should consider enrolling in ethnobotany field courses. Many undergraduates and beginning graduate students spend a semester or two in laboratories learning the nature of research. This is an ideal means of deciding whether a subject merits the commitment to a graduate program. Ethnobotany presents a different obstacle. First, fieldwork requires entrée into the community, something that may require months or years of effort. Secondly, fieldwork is in the field. While a student may devote 5-10 hours a week to laboratory research, much fieldwork requires a more extensive time commitment and financial resources. Summer field courses such as those offered by the University of Michigan, the National Tropical Botanical Garden, or the Institute for Tropical Ecology and Conservation can fill the missing link. Another stopgap option is to find ethnobotany faculty from outside the university to serve on graduate committees. For example, I co-directed a student at the University of Florida and serve on graduate committees at the University of Texas and University of Tennessee. Several other ethnobotanists in academia do the same.

Prospective students need to prepare better for graduate school. The successful ethnobotanist is well trained in both botany and ethnology. Those interested in medi-

cal plants must also study chemistry and physiology. Students often say that they are "interested in ethnobotany but do not like chemistry." Another problem has less to do with the naiveté of prospective students and more to do with their academic histories. Many undergraduates develop an interest in ethnobotany late in their academic careers and, therefore, lack the requisite training in biology and anthropology. To compensate for these deficiencies there is often but one solution. Students must spend a year or two taking undergraduate level courses to gain the necessary basics. Several of my students lacked the necessary requisites to be admitted to the Department of Biological Sciences. They spent a semester or more taking undergraduate courses. What does this mean to the prospective graduate student in ethnobotany? Get a good foundation in science as an undergraduate.

What is the minimum necessary for an ethnobotanist? I will answer for biology and let the anthropologists defend their requisites.

- Introductory Biology – two semesters
- Introductory Chemistry – two semesters
- Organic Chemistry – two semesters
- Economic Botany or Ethnobotany
- Systematic Botany
- Statistics – two semesters
- Cultural Anthropology
- Foreign Language and Linguistics

One could also make the case for Calculus, Evolution, Ecology, Genetics, Plant Morphology, Phytochemistry, and Physical Geography. For students interested in medicinal plants, Human Physiology, Human Anatomy, Molecular Biology, and Cell Biology, also are important.

My career in ethnobotany began while I was a post-doc at the New York Botanical Garden. Fortunately, my academic interests had always been broad. As an undergraduate, I majored in biology and geology/geography. During graduate study, I took philosophy, chemistry, geology, and music courses in addition to biology courses. An academic dean once challenged me to justify my desire to take a course in Greek and Roman Philosophy. He wanted to know what in the world that subject had to do with science. My temptation was to respond, "If you are that ignorant, then there is nothing I can say." Instead, I tried, with limited success, to explain the relationship between science and philosophy.

Indeed, every course I have taken has been relevant to ethnobotany. Physiology, for example, was a required course during for my undergraduate studies. Except for explaining the reaction of two classmates who had consumed LSD the night before one class, I believed that the course was not relevant to my interests. While recently teaching a new Medical Botany graduate course, however, I made frequent references to my old physiology notes. Moreover, the response of my classmates to LSD is re-

markedly similar to the response of shamans who have taken *Banisteriopsis caapi*.

Research Opportunities

Ethnobotanical, like all cultural research, is characterized by a difficult introductory phase. You must understand a culture before you can understand its plant use. Unfortunately, this requires a significant time commitment. A researcher can fly Costa Rica and begin collecting data on *Datura* the same day. An ethnobotanist, on the other hand, may spend weeks or months just obtaining permission to visit a village. If we consider ethnobotany in its broadest scope, however, research opportunities abound. There is no place in the country that a student could not find an interesting and publishable research topic involving plants and people.

Funding

Because of the nation's current fiscal problems, funding for ethnobotany and most other disciplines has decreased. The Environmental Protection Agency's STAR fellowships were potential sources of support, but the Bush administration threatened to cancel the program for the 2002-2003 year. Yet, there are still opportunities. Funding for the National Center for Complementary and Alternative Medicines of the National Institutes of Health has increased dramatically in recent years. Florida International University, for example, recently received \$1.2 million for training Ph.D. students and post-docs in tropical botanical medicines. Jan Salick, of the Missouri Botanical Garden, received a \$43K exploratory grant from NSF (Intellectual imperatives in ethnobiology: Research, methodology, analyses, education, and funding for a rapidly expanding field) to foster funding in ethnobotany. This is an especially promising initiative.

The Garden Club of America Tropical Botany Anne S. Chatham Fellowship in Medicinal Botany and Tropical Botany Awards are potential sources of support for graduate students (www.gcamerica.org/scholarships.htm). Particularly innovative is Botany in Action (BIA). The Garden Club of Allegheny County established Botany in Action in 1995 and has generously funded and mentored many ethnobotany students. In 2000, the program was transferred to Phipps Conservatory and Botanical Gardens (www.phipps.conservatory.org/learn/research/botany). The BIA model could be emulated by other gardens and garden clubs.

Employment.

The prospective for increasing the number of academic positions in ethnobotany is not promising. Why then are students so interested in the subject? I suspect it is due to idealism, naiveté, and cognitive dissonance. Many Ph.D. students enter their discipline because of the intellectual and emotional draw. Few prospective biologists or anthropologists are drawn by the financial rewards. These are the ideal students, in some respects. Every professor delights in

the rare student who is driven solely by intellectual curiosity. Such a person is a refreshing contrast to the undergraduate who asks, "Do we need to know this for the exam?" or the prospective graduate student who objects to spending a year in a remote field site. Nonetheless, faculty have an obligation to alert their students to the realities of the job market.

Ecology suffered from a surplus of Ph.D.s in the 1970s and 1980s. The applicant pool grew at a rate far surpassing the growth in jobs. It was not uncommon to have 400-500 applicants for a single position. While the number of Ph.D.s in ecology has always been greater than the number of ethnobotanists, we have an obligation to our students to provide a realistic perspective on the job market. Perhaps that means we should not to overproduce Ph.D. students. A counterintuitive notion in population biology is that, on average, only one offspring per individual survives to reproduce (or two per female for unisexual organisms) regardless of an organism's cumulative clutch size. Should we apply this analogy to academics? In a steady-state job market, it would mean that we train one replacement per generation. I do not advocate this position, but it leaves us one alternative --- we must work diligently to increase the number of positions both within and outside academia. Within academia, only the University of Hawaii has been successful in this endeavor, creating several positions during the past few years.

There are many opportunities besides the university. I believe that it is no coincident that Ghilleen Prance, former director of the Royal Botanic Gardens Kew, or Paul Cox, former director of the National Tropical Garden are ethnobotanists. Fairchild Tropical Gardens employs three ethnobotanists in its education program. Gardens are where people and plants meet, in other words, gardens fall under the domain of ethnobotany. If ethnobotany encompasses the full range of plant-people interactions, then the possible avenues for employment are nearly endless. We also should promote ethnobotany's relevance to Introductory Botany and non-major courses as well as agriculture, horticulture, conservation, resource management, education, and rural development. Well-trained ethnobotanists should be able to teach or conduct research in all of these areas.

Theory

If ethnobotany is to become a mature discipline, it must develop a theoretical framework. We have much to learn from anthropology. While it is sometimes amusing to watch cultural anthropology's debate over various schools of thought, ethnobotany has little over which to debate. Virtually every cultural anthropologist identifies his or her theoretical orientation. Whether it is structural-functionalism, cultural ecology, neoevolution, ethnoscience, or historical ecology, one can evaluate the methodologies and interpret the results in light of the orientation. Ethnobotanists, though rarely explicit as to their orientation, are generally utilitarianists. They evaluate the way in which a culture solves a problem with

a plant or plant-derived product. Occasionally, we borrow from anthropology but often incorrectly or impartially. For example, ethnoecology has a different meaning in anthropology than it does in ethnobotany.

The truly interesting questions in ethnobotany are the theoretical ones. Why do Seminoles in southern Florida and Highland Quechua speakers in Peru use *Tillandsia usneoides* for the same purpose? How did Amazonian inhabitants discover dimethyltryptamine containing admixtures to hallucinogens? What does the structure of an indigenous plant name reveal about the history of the plant's use? One rich source of theory stems from comparative studies among cultures. Unfortunately, we often lack the data to make these comparisons. The data may not be extant or it may have been collected and recorded in such a way that it is not comparable.

A potential problem is that methodology becomes the end rather than the means to the end in ethnobotany. While I applaud the demand for more rigorous methodology, we need to avoid the errors in ecology and systematics. For a twenty year period beginning in the 1970s scores of ecological papers debated which ordination technique was most appropriate. Arguments abounded about the strengths and merits of principal component analysis, detrended correspondence analysis, and nonmetric multidimensional scaling (e.g., Allen & Shugart 1983, Beals 1984, Fasham 1977, Gauch & Wentworth 1976, Gauch & Whittaker 1972, Gauch *et al.* 1977, 1981, Jackson & Somers 1991, Karadzic 1999, Kenkel & Orlóci 1986, Minchin 1987, Palmer 1993, Peet 1980, Peet *et al.* 1988, Prentice 1977, ter Braak 1986, 1997, van Groenewoud 1992, Wartenberg *et al.* 1987, Whittaker *et al.* 1987). Similarly, Duane Isley (1985) described the "sequential saviors of systematics," noting how methodology in taxonomy became an end unto itself. In both disciplines, the interesting biology was ignored. Questions should determine methodology, not the converse.

Conclusions

At a recent meeting, a colleague asked me, "What exactly is ethnobotany?" The task of educating the public, students and our peers is ongoing. Nancy Turner (1995) succinctly defined ethnobotany as "the science of people's interaction with plants." There are several important points about this definition. First, it purports that ethnobotany is a science. If we accept this proposition, particularly if science is used in its broadest sense to include both the natural and social sciences, then ethnobotanists must be well-trained scientists. This includes both the basics that are directly related to the subject (e.g., biology, chemistry, anthropology) but also areas relating to the practice of science (statistics, mathematics, logic, and philosophy).

Expanding ethnobotany's scope to include all plant and human interactions greatly increases the funding, research, and job opportunities for the discipline. More importantly, there is no compelling intellectual argument for restricting ethnobotany's reach to traditional cultures. While doing this, ethnobotanists need to develop a theoretical orientation so that the discipline moves from its infancy into a mature stage.

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