

ETHNOBIOLOGY IN THE CITY: EMBRACING THE URBAN ECOLOGICAL MOMENT

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In a world where most people live in large cities, it is urgent that we address the urban reality from an ethnoecological perspective. This endeavor would contribute significantly to building ecologically viable and socially fair cities. (Almada 2011:1)

More than half the world's human population resides in cities (United Nations Economic and Social Affairs Population Division 2015)¹. Unpacking this singular statistic, it becomes clear that people come to live in urban environments via numerous routes. Some have lived in cities all their lives and are descendants of city dwellers. In other cases, cities spread and encircle them (Hurley et al. 2008; Unnikrishnan and Nagendra 2015). Increasingly, rural residents are national and transnational migrants to cities, pushed by armed conflict, natural disasters, and economic need or opportunity (United Nations Economic and Social Affairs Population Division 2013). In the case of the latter two routes, traditional ecological knowledge and practices involving flora and fauna may persist in urban habitats that constitute biocultural refugia (Barthel et al. 2010). This special section lifts up the proposition that such spaces, knowledge, and practices are fertile ground for ethnobiological study.

A number of ground-breaking papers have examined ethnobiological knowledge and practices in urban environments (see, for example, Ceuterick et al. 2008, 2011; Ellena et al. 2012; Pieroni et al. 2005, 2007, 2008; Vandebroek et al. 2010). However, the exceptional nature of these articles suggests that urban topics remain somewhat marginal in the field. With an additional 2.5 billion human souls expected to reside in urban environments by 2050 (United Nations Economic and Social Affairs Population Division 2015), we suggest there is an opportunity and, indeed, an urgent need for ethnobiologists to reconsider the field's boundaries and bring increased attention to what Gary Nabhan (2016) has called the ethnobiosphere in urban environments. In making this call, we recognize that some disciplinary re-definition may be required.

Over the past two decades, the field of ethnobiology, together with its cognate discipline of ethnobotany, has variously defined its subject matter as:

- “the interactions and relationships between plants and people over time and space” (Ethnobotany Summit 1997:4),

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- “how traditional environmental knowledge or local natural history is central to cultural knowledge” (Hunn 2006:143),
- “the knowledge and livelihoods of people “living close to nature’ ” (Hunn 2007:9),
- “the relationship between people and other life forms throughout time” (Wyndham et al. 2011:111), and
- “interactions between cultures, habitats, and creatures” (Nabhan 2016:5).

These self-reflexive definitions have in common an emphasis on ways people live in relationship with biota. They differ in terms of the boundaries they draw (or do not draw) around the human beings and, by extension, environments that are of interest.

Commitment to the intertwined conservation of human cultures and the other-than-human environment also is common across all ethnobiology’s recent self-definitions. Evoking an accelerating and often perilous rate of change, leaders in the field call on ethnobiologists to attend to the future of the planet (Nabhan 2016) as negotiators between local knowledge and culture and the power-laden realms of the Academy, political economies, and governing structures (Hunn 2007; Wyndham et al. 2011). The aspiration is to be no less than “the science of survival” (Ethnobotany Summit 1997).

We were trained in geography, a discipline absent from most lists of those from which ethnobiologists hail (see, for example, Wyndham et al. 2011). However, we come from the human-environment interactions tradition, one of the oldest subfields in the discipline (Zimmerer 2010). Today, specialty groups of the American Association of Geographers address many topics relevant to the pursuits of ethnobiology such as cultural and political ecology, development geographies, and indigenous peoples. Thus, with thanks for the invitation to edit this special section, we make bold to include ourselves in the ranks of ethnobiologists and use the first-person plural in the remainder of its introduction.

We begin by examining further the boundaries the five recent self-definitions cited above have set around the field of ethnobiology, giving particular attention to those aspects that appear to foreclose or open the possibility of urban scholarship. A brief summary of recent urban ethnobiological projects demonstrates that there is space for such work, even if it is comparatively underpopulated in relationship to the rest of the field. Recent developments in the literature on urban social-ecological systems suggest some additional intellectual resources for ethnobiologists wishing to work outside rural arenas. We then summarize the four papers which make up this special section, drawing out what we believe are their most salient points for an ethnobiology in and of the city. Finally, we conclude with reflections on the opportunities and need for ethnobiology to address itself to biocultural complexity where the majority of human beings reside.

Ethnobiology’s Boundaries

Taking stock is bound to be a frequent exercise in an intellectual field that embraces scholars drawn from many academic disciplines (Wyndham et al. 2011).

Reviewing the larger disciplinary context for urban ethnobiology, we have been interested to examine the declaratives and silences regarding the environments and peoples viewed as constituting ethnobiology's focus. In particular, we find interesting five documents from the last twenty years, in which leaders in the field define its parameters. Proceeding chronologically, they are a summit of ethnobotanists (Ethnobotany Summit 1997), an essay on one of the field's primary tasks (Hunn 2006), a review of its history (Hunn 2007), results from a survey of three organizations whose members include ethnobiologists (Wyndham et al. 2011), and the introduction to an edited volume on the future of ethnobiology (Nabhan 2016).

In the waning years of the twentieth century, a gathering of 44 ethnobotanists at the National Tropical Botanical Garden concluded their deliberations by drafting the Kaua'i Declaration (Ethnobotany Summit 1997). The declaration is a statement of the responsibilities of ethnobotany, ethnobiology, and ethnoecology to be a force for sustainability in "human relationships with the living world" (Ethnobotany Summit 1997:4). The Kaua'i Declaration is silent on the question of human population densities in this endeavor. Rather, it highlights what today might commonly be referred to as biocultural diversity and adaptation in ethnobiological relationships:

The greatest resource that people have is their ability to innovate...This capacity to innovate has been expressed in creative ways by different groups of people faced with varied environments and social challenges; we must attempt to understand those ways for our individual and common benefit. (Ethnobotany Summit 1997:4-5)

Cities most decidedly constitute varied environments—from parks to gardens to public rights of way, with remnant and novel biota—and present culturally diverse peoples with social challenges—from nutrition to health to maintenance of spiritual practices.

Writing in the pages of this journal a decade later, Eugene Hunn chronicled what he termed the "four phases of ethnobiology" (Hunn 2007). From a first phase, which he dates to the coining of the term "ethnobotany" in 1895 (while recognizing the ethnobiological work of sixteenth century scholars of Aztec culture), to a fourth phase in the latter decades of the twentieth century, Hunn (2007:8) locates the focus of ethnobiology in "the knowledge and livelihoods of people living close to nature". Tracing the dominant tendencies of the discipline from a Western ethnocentric instrumentalism to activist partnerships with indigenous peoples residing in their homelands, he specifically contrasts the appropriate realm of ethnobiology with the knowledge and practices of "modern urban perspectives" (Hunn 2007:8). Hunn concludes that it is ethnobiology's mission "to document primitive peoples² in their tight environmental embrace while there is still time" (Hunn 2007:9). Writing the previous year about the field's responsibility to conserve and cultivate appreciation of traditional ecological knowledge, he is still more explicit in his contrast of rural peoples' knowledge of and connections to their local natural history and what he characterizes as the profound ignorance of modern urbanites. The former, he casts as the subjects of ethnobiology, the latter as ethnobiology's audience. This perspective would appear to remove the urban from the purview of ethnobiology, fixing nature, traditional ecological knowledge, and

biota-based livelihood practices in rural environs, especially indigenous territories. For Hunn, a core mission of ethnobiology is a "fierce commitment to resist the final triumph of global capitalism" (Hunn 2007:9), keeping front and center biocultural relationships unmediated by the market economy.

Also in this journal, Wyndham et al. (2011) draw on survey results to reflect on the identity of ethnobiologists, as well as the past and future of ethnobiology. The diversity of disciplinary and epistemological homes, they maintain, position ethnobiologists at strategic interstices for negotiating between the many players and powers that shape possible "relationship[s] between people and other life forms" (Wyndham et al. 2011:111) in a rapidly changing world. Evoking the numerous crises affecting humans and environments in the present century, Wyndham et al. propose a fifth phase for ethnobiology, in which the field assumes a more active intellectual and applied role at scales from the local to the international. This call for ethnobiologists to exercise their capacity and responsibility "to play a larger role in the way this century unfolds" (Wyndham et al. 2011:124) in no way precludes urban residents and environments as subjects for such engagement. Indeed, at the point in history when urbanization is a hallmark change, their exhortation may be regarded as requiring it.

Most recently, in the introduction to his 2016 edited volume on the future of the field, Gary Nabhan (2016:4) celebrates the courage of young ethnobiologists to venture into "other landscapes and mindscapes, which often have been neglected or dismissed by mainstream society". Noting that what he calls cultural ecotones are "spaces of intense interaction among cultures, habitats, and creatures" (Nabhan 2016:4), he summarizes a key finding of ethnobiology: direct engagement with places and other species shapes human identities and plays important roles in physical, emotional, and spiritual well-being. Here, again, cities are not named specifically, but neither are they excluded by Nabhan's fundamental considerations. Indeed, taking seriously his proposal that we bring a "beginner's mind" to the work of ethnobiology, suggests we set aside assumptions that biocultural relationships end at the borders of cities. Rather, we might turn fresh eyes on urban landscapes and mindscapes in search of cultural ecotones and any lessons they have for survival in our current time and places.

Weaving together key elements of these definitions, we see scope for a robust urban ethnobiology with only minor adjustments in the field's current boundaries. The same skills and methods that historically have been directed at rural locations and peoples can be turned toward cities. Approaching cities with the tools of ethnobiology and without teleological preconceptions (Emery and Pierce 2005) opens the possibility to discover intimate interconnections between people and nature where all too often they have been written off. The process already is in progress, with a number of ethnobiologists leading the way in this urban turn.

Urban Ethnobiology to Date

As suggested above, it is not that ethnobiologists have ignored urban places and contexts. But urban ethnobiology as a distinctive subfield is still relatively

new. In a recent article, entitled "Urban Socio-biodiversity: Ethnoecology of Cities," Almada (2011) provides an introduction to and foundation for the application of ethnobiology to the study of cities and their distinctive natures. Drawing on Marques's (2001) reflections on ethnoecology, Almada (2011:3) proposes five connections between humans and nature that would constitute a comprehensive ethnoecology in urban areas: "1) human/mineral, 2) human/plant, 3) human/animal, 4) human/human being, and 5) human/supernatural." In particular, Marques (2001:3) suggests this approach could serve as the basis "for reflect[ing] on the ecological knowledge in urban areas." Almada goes on to enumerate four areas where emerging ethnoecological research in urban areas is distinctive from non-urban ethnoecology, namely the presence of hybrid knowledges and spaces, the importance of understanding meanings and emotional relationships with the biophysical environment, the construction and transmission of ecological knowledge, and the ways in which ecological knowledge influences urban planning and policy. Finally, Almada suggests five areas for future study: 1) how traditional practices persist within urban areas, 2) how biodiversity varies across the social gradients of urban space, 3) how urban areas produce new cosmologies, 4) how the use of space influences the perceptions of individuals about urban ecosystems, and 5) the perceptions and knowledges of urban ecosystems held by people living in cities.

Articles published since Almada's 2011 monograph and earlier research not included in that review address several topics that fit into this framework, including how traditional ecological knowledge in cities is shaped by the use of plants (Almada 2011; Lelia Pochettino 2008; Mati and de Boer 2010; Nguyen 2003) and animals (Souto et al. 2011). Urban ethnopharmacology receives particular emphasis through research on topics such as continued use of medicinal plants in urban settings (Alberto Hurrell et al. 2011, 2013; Ceuterick et al. 2011; Kose et al. 2015; Philander 2011; Pieroni and Gray 2008; Vandebroek and Balick 2014), differences in dissemination of medicinal plant knowledge by rural versus urban teachers (Ladio and Molares 2013), and historical investigations of this relationship (Alm 2013; Łuczaj and Kujawska 2012; Svanberg et al. 2012). A number of studies examine the role of urban markets in maintaining access to and use of wild plants for medicinal practices (Dogan and Nedelcheva 2015; Leitão et al. 2014; Lima et al. 2016; Monteiro et al. 2011; Termote et al. 2012), including how urban "weeds" become commodified (Ladio and Molares 2013). Other ethnobiologists have investigated perceptions and management of urban ecosystems for water quality (Collier et al. 2015; Gartin et al. 2010), differences in local plants and land uses by members of a cultural group residing in rural and urban settings (Furusawa et al. 2014; Molebatsi et al. 2010) or along the rural-periurban gradient (Poot-Pool et al. 2015; Sogbohossou et al. 2015). Contemporary human mobilities also provide the context for research on the effect of migration and introduction of plant landraces on species genetics within urban home gardens, the effects of urbanization on plant use by traditional peoples in formerly rural areas (Gandolfo and Hanazaki 2011; Luziatelli et al. 2010; Oliveira et al. 2011), and the effects on local plant usage of return migration by urbanites to rural areas (Özüdoğru et al. 2011).

Urban ethnobiology also has begun to explore the role of space and place within urban ecological dynamics. For example, new attention is being paid to specific landscape features, such as urban hedges, as sites of biodiversity and sources of socio-economic functions through provision of food and medicine (Molares and Rovere 2016). Silva and Proenca (2008) investigate how backyard garden practices and access to nearby forests affect the availability and usage of particular medicinal plants. Likewise, de Souza Milanese et al. (2013) examines the influence of landscape management on the presence of a culturally important species (see also Hurley et al. 2013). Poe et al. (2013) document the role of Seattle's urban forest in the maintenance of key food and medicinal practices by urban residents, including Native Americans, raising questions about how access to key species challenges conventional understandings of urban environmental justice and environmental management. Elsewhere, Wehi and Wehi (2010) find that urban landscapes are important to Maori elders seeking medicinal plants for their pharmacological practices, while Grabbatin et al. (2011) demonstrate how African American basket-makers negotiate continued access to key species in urbanizing landscapes.

Despite this growing body of urban ethnobiological investigation, the subfield has yet to achieve the breadth of endeavor suggested by Almada (2011). Too frequently the city serves as backdrop rather than subject (Gobster 2007; McLain et al. 2014). With this claim we do not wish to discount the importance of the studies detailed above. Rather, it is our intent to point out that less is known about relationships between people and urban plants, animals, fungi, and greenspaces of all types outside markets, gardens, and residential landscapes. Moreover, we seek to emphasize the value of understanding these processes as topics of investigation, rather than assuming them as constraining factors in the persistence of ethnobiological practices. Recent literature on urban social-ecological systems may be of value in realizing the greater potential of urban ethnobiology.

Insights from the Urban Social-Ecological Systems Perspective

Outside ethnobiology, scholarly examination of urban social-ecological systems is rapidly expanding, including interdisciplinary efforts to examine the complex ways in which humans interact with and shape the ecosystems that characterize cities. Among these efforts, a number of approaches focus on documenting and describing the key ways in which particular elements of the environment provide benefits to humans. Much of the research on direct and indirect benefits to humans from urban ecosystems focuses on regulating services, such as the importance of trees and urban forests for ameliorating pollution, and supporting services, such as biodiversity (Elmqvist et al. 2014; Haase et al. 2014). Perspectives on the importance of these ecological functions for humans often center on quantifying their economic value in terms that explicitly or implicitly speak to avoiding financial outlays for technologies and hardscapes to reduce pollution and/or avoid exposure to natural hazards.

At the same time, there is growing awareness that these benefits extend to cultural and provisioning ecosystem services, including where and how people derive social and spiritual importance from the urban environment. These benefits include the material and symbolic importance of the urban environment for social reproduction, and the material ways in which natural resources in and around the city sustain communities and individuals through food and fiber supplies (Barthel et al. 2010, 2013; Haase et al. 2014; Poe et al. 2013; Shackleton et al. 2015; Unnikrishnan and Nagendra 2015). Studies highlight peri-urban agriculture's role in supplying food to cities (Haase et al. 2014) and urban gardens as sites of self-provisioning and biocultural knowledge transfer (Barthel et al. 2010, 2013). Analyses of these benefits extend to the role that urban nature plays in the resilience of human communities and individuals to social, political, and biophysical disturbances. These analyses frequently include the cultural and material benefits that city residents derive from interacting with and using plants and other forms of biodiversity (Hurley et al. 2015; McLain et al. 2012, 2014; Poe et al. 2013).

A key feature of this research is recognition of urban ecosystems as novel configurations (Francis et al. 2012). Cities feature assemblages of plants and animals that reflect biogeophysical processes, as well as historical and contemporary human activities. The latter include diverse forms of land-use, trade, and markets (Del Tredici 2010). Urban biota are influenced by native species (those with long histories of presence, absent known human introduction), cultivars and other economic species (foods, horticultural, and aesthetically pleasing organisms), as well as flora and fauna arriving without active human intent. Indeed, Pincetl (2015) maintains that urban environments are so distinctly different from other ecosystems that they should be regarded as entirely anthropogenic, even while acknowledging the importance of other-than-human nature in their development. Moreover, Haase et al. (2014) point to cities as places of experimentation on questions of sustainability. Cities, then, offer key sites for the study of biocultural relationships through time and space.

In Pursuit of Biocultural Complexity in Urban Environments

The articles in this special section represent a number of theoretical and conceptual approaches to examining socially differentiated engagements with urban nature. As such, they illustrate the diversity of potential approaches for ethnobiologists seeking to engage with biocultural processes in cities. They suggest concerns that parallel or offer opportunity for engagement with ethnobiological explanations of human and cultural engagements with nature in other settings.

Examining relationships between residents of Grahamstown, Eastern Cape, South Africa (2011 population approximately 70,000) and the common lands surrounding it, Cocks et al. find that these landscapes and their characteristic flora and fauna retain vital roles in cultural identity and well-being. The significance of this remnant bush for the largely Xhosa-speaking people of this

and other townships may be seen in its local name, *ihlathi lesiXhosa*, which translates to English as “Xhosa forest.” Ihlathi provides sites of ritual, livelihood resources, and places of comfort and rest. However, complex social relationships condition access along axes of power and gender. Often sacrificed in the drive to provide housing in South Africa’s rapidly expanding townships, Cocks et al. argue that these municipal commonages and traditional cultural relationships with them need to be understood and conserved.

Chan et al. examine the functions of community gardens and gardening in Lincoln, Nebraska, USA (2015 population approximately 275,000) as social-ecological refuges. For both international refugees and rural European Americans relocated to the city, the 20 gardens managed by a non-governmental organization help sustain cultural identities and create connections to local environments reminiscent of those in their place of origin. Community gardens also facilitate adaptation and resilience to the dislocations of the migrant experience. The capacity to self-provision with the produce from personal plots is a critical livelihood strategy for some. Community spaces in the gardens create opportunities to forge and strengthen social networks within nationalities and cultures, as well as knowledge exchange between them.

The medicinal and pharmacological uses of plants by particular cultural groups are a staple of ethnobotanical studies, but less attention has been paid to the intersection of policy and the practices of urban peoples outside formal policy circles. Drawing on ethnographic fieldwork and policy analysis, Kerry Brown examines this intersection in the peri-urban Baixada Fluminense region of Rio de Janeiro (2015 population approximately 6.5 million). Her research uses case studies of Afro-Brazilian religious communities to better understand how these communities’ phytotherapeutic pharmacy practices relate to and intersect with national policies that do not specifically recognize their uses within existing legal designations. The study sheds light on the complexity of policy efforts to support ethnomedicinal practices. Brown shows how formal institutional definitions do not recognize the complexity of racial and ethnic identities, nor do they necessarily provide adequate institutional engagements with the spaces and institutions where medicinal plant exchanges and uses play out.

Material nature and landscapes long have been recognized for their importance in shaping cultural practices and for producing particular social meanings, including for religious and ceremonial purposes. But how do these processes play out within cities and in what ways do particular practices signal adaptations to or embrace of particular urban spaces? Svendsen et al. report on research that uses observational study, photo documentation, and interviews to examine how residents of New York City (2015 population approximately 8.5 million) modify and make use of material features in parks and how parks, in turn, support mental, emotional, and spiritual well-being. The study provides a picture of the myriad ways individuals living in the city interact with different types of natural features and how these interactions produce personal meanings, draw on specific types of locations or elements to foster attachments, and help diverse individuals meet their personal and spiritual needs.

Conclusions

We agree wholeheartedly with Hunn's insistence on the continued importance of understanding, protecting, and learning from peoples whose lives are linked to the land (Hunn 2006, 2007). However, we respectfully suggest that cities and urban dwellers are not the antithesis of this proposition. To be certain, the lifeways of the majority of urban residents in even small cities are different in their degree of reliance on the land than those of, for example, indigenous peoples who reside in their ancestral territories and are less integrated into the global economy. But as the papers in this special section suggest, the knowledge and practices that are the subject matter of ethnobiology may not, in fact, be so fixed in place nor absent from urban environments.

People with rich traditional ecological knowledge sometimes come to live in cities, by choice or through lack thereof. At times, cities grow up around people with long histories of living on that land. In such circumstances, knowledge and practices are not abruptly and entirely extinguished. Land bases shrink and floral and faunal species compositions are altered. But as the signatories to the Kaua'i Declaration note (Ethnobotany Summit 1997), humans and cultures are remarkably adaptable. Rather than writing off the dwelling places of over half of humanity, we propose that by including urban peoples and environments within its sphere of interest, ethnobiology will strengthen its contributions to the conservation of biocultural diversity.

The papers in this special section demonstrate that rich and complex relationships between people and other life forms persist in the social and ecological configurations of cities. These relationships are sometimes novel, sometimes reflect traditional ecological knowledge and livelihoods, and sometimes are an adaptive hybrid of the two. If our goal is to take conservation of biocultural complexity seriously in the twenty-first century, we will bring curiosity and a "beginner's mind" to the study of cultures and locations beyond our usual comfort zones (Nabhan 2016:9). We are persuaded that such a fresh look will enrich ethnobiology both empirically and theoretically.

We understand that for many ethnobiologists, working in urban environments will be discomfiting. Of course, not all should do so. Like Hunn (2006), we do not believe ethnobiology need choose to focus on either the rural or the urban. Indeed, as the scholarship highlighted here demonstrates, there are rich possibilities in examining the complex dynamics of biocultures as they move between rural and urban environments. Borrowing from Nabhan, we propose to ethnobiology, as a whole, and individual ethnobiologists, in particular, that we think as if we had "not noticed the box" (Nabhan 2016:5) delineating the human population densities and mobilities of the discipline's boundaries in its first four phases but, rather, pursue biocultural complexity when and where it occurs. In the fifth phase of ethnobiology proposed by Wyndham et al. (2011:124), with its aspiration to "play a heightened role in the needs of a world coping with rapid ecological change and shifting political economies", doing so will make powerful contributions to realizing the promise of "the science of survival" (Ethnobotany Summit 1997).

Notes

¹ In 2014, some 3.9 billion people.

² Hunn uses the term “primitive peoples” advisedly, as indicated by its enclosure with quotation marks.

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