BioOne COMPLETE

Living Lists: How the Indigenous Canela Come to Know Plants Through Ethnobotanical Classification

Author: Miller, Theresa L.

Source: Journal of Ethnobiology, 36(1) : 105-124

Published By: Society of Ethnobiology

URL: https://doi.org/10.2993/0278-0771-36.1.105

BioOne Complete (complete.BioOne.org) is a full-text database of 200 subscribed and open-access titles in the biological, ecological, and environmental sciences published by nonprofit societies, associations, museums, institutions, and presses.

Your use of this PDF, the BioOne Complete website, and all posted and associated content indicates your acceptance of BioOne's Terms of Use, available at www.bioone.org/terms-of-use.

Usage of BioOne Complete content is strictly limited to personal, educational, and non - commercial use. Commercial inquiries or rights and permissions requests should be directed to the individual publisher as copyright holder.

BioOne sees sustainable scholarly publishing as an inherently collaborative enterprise connecting authors, nonprofit publishers, academic institutions, research libraries, and research funders in the common goal of maximizing access to critical research.

Downloaded From: https://bioone.org/journals/Journal-of-Ethnobiology on 28 Mar 2024
Terms of Use: https://bioone.org/terms-of-use

Journal of Ethnobiology 36(1): 105–124 2016

LIVING LISTS: HOW THE INDIGENOUS CANELA COME TO KNOW PLANTS THROUGH ETHNOBOTANICAL CLASSIFICATION

Theresa L. Miller[1]

This paper explores how members of the indigenous Canela community of northeast Brazil value and make meaningful their engagements with cultivated plants in their local Cerrado ("savannah") environment through the recent creation of written ethnobotanical lists and through more traditional multi-sensory, embodied approaches. It compares the traditional approach of Canela gardeners coming to know and "becoming with" growing plants through caring, affectionate activities such as garden visits, ritual singing, food sharing, and shamanic communication, with that of the recent written documentation of ethnobotanical knowledge that is associated with people and things coming from a world "outside" the community. Through the creation of fluid and dynamic living lists, Canela gardener parents are seeking new and innovative ways to engage with and know the plant children growing in their gardens. Both the traditional and newer approaches to plant knowledge can and do co-exist in the community. Moreover, Canela gardeners are embracing and working through the "ontological frictions" that emerge between disparate ways of knowing about and of becoming alongside cultivated plants. The Canela case can contribute to a broader understanding of biodiversity management as "childcare" and encourage a deeper engagement with both humans' and plants' perspectives in future ethnobotanical studies.

Keywords: *biodiversity, plants, indigenous Canela, northeast Brazil, childcare*

Introduction

The myriad ways that people and plants interact with one another and the knowledge that emerges from these encounters varies cross-culturally, and these epistemological differences are at the heart of ethnobotanical studies. Comparisons are often made between non-Western indigenous and traditional classification systems and the more codified Western Linnaean taxonomic system (Berlin 1992). In this paper, I explore the epistemological disjunctions that arise between more traditional indigenous methods of coming to know plants in embodied, multi-sensory ways and the more "Western" approach of synthesizing plant knowledge through written taxonomy. I suggest that these disjunctions or frictions between local ethnobotanical classification and "post-Linnean taxonomic orthodoxy" are not only epistemological but also ontological (Ellen this issue). That is, the tensions in this paper emerge from disparate ways of knowing about plants as well as being or "becoming with" (Haraway 2008:16–17) them in distinct "life-worlds" (Miller 2015:54–60). Ontological differences, in this sense, are about "different worlds instead of different worldviews" (Kohn 2013:10) in which humans and nonhumans emerge and engage (or disengage) with one another.

[1]Peter Buck Postdoctoral Fellow, Department of Anthropology, National Museum of Natural History, Smithsonian Institution, 10th & Constitution Ave. NW, Washington, DC (millerth@si.edu)

Downloaded From: https://bioone.org/journals/Journal-of-Ethnobiology on 28 Mar 2024
Terms of Use: https://bioone.org/terms-of-use

The division between the life-worlds that are discussed here, that of the indigenous Canela and the Western world of people and things from outside the community, is understood heuristically to constructively "point to difference" rather than as a "description of a state of fact" (Candea 2010:178). Moreover, these ontological worlds are not static entities but rather can and do change over time, especially through the tensions between them that are discussed here. By exploring changing Canela engagements with plants through an ontological approach, I suggest that it is possible to learn more about the opening up of the Canela life-world to new ways of learning about and being with plants, which can perhaps help safeguard these people-plant engagements in the wake of rapid deforestation and habitat loss in the region.

For the indigenous Canela community of northeast Brazil, subsistence horticulture involves intimate relationships that unfold throughout the life courses of both humans and cultivated plants. Canela gardeners conceptualize their cultivated crops as children who require frequent care and affection. While the Canela have traditionally identified and named different crop species and folk varieties orally, some gardeners (with the involvement of the anthropologist) have recently begun creating ethnobotanical lists of their crops that loosely adhere to a Linnaean taxonomic schema. The importance of these lists to the expert gardeners with whom I worked and to the community as a whole is especially significant. I examine how more traditional multi-sensory engagements between gardeners and plants compare to this recent interest in listing and categorizing plants in written form.

In particular, I explore the implications of creating these written ethnobotanical lists for the Canela community in its efforts to care for plant children. Naming and categorizing garden plants is, I argue, one of many ways through which Canela people appear to give value and meaning to their engagements with cultivated crops. Additionally, I explore how writing down this naming process, a technique involving people and materials coming from the "outside"—that is, another "world"—highlights the tensions between these different ways of engaging with plants and the worlds themselves. These ontological tensions, which involve the friction between different processes of world-making, can also lead to openings and transformations that can benefit local people. In this case, I suggest that the Canela gardeners are transforming the outside lists into a new and innovative way of caring for their plant children within their own highly transformational life-world. The dynamic and fluid living lists also offer new ways for the Canela to pass on their knowledge of and experiences with cultivated plants to younger generations of gardeners, even as illegal logging and other forms of environmental destruction threaten the biodiversity of these gardens.

While the paper focuses mainly on how Canela humans understand and engage with plants, it also recognizes the importance of the plants themselves and how they interact with their human parents in multi-sensory, embodied ways. Indeed, I attempt to show how ethnobotanical classification, understood as a form of childcare, is not solely a human activity, for the cultivated plants themselves—with their distinct sensory capabilities, physical characteristics, and qualities—form part of this naming process. To conclude, I ponder ways to "interview" the plants themselves (Hartigan et al. 2014) to learn more about plant perspectives in the unfolding, transformational Canela life-world.

Downloaded From: https://bioone.org/journals/Journal-of-Ethnobiology on 28 Mar 2024
Terms of Use: https://bioone.org/terms-of-use

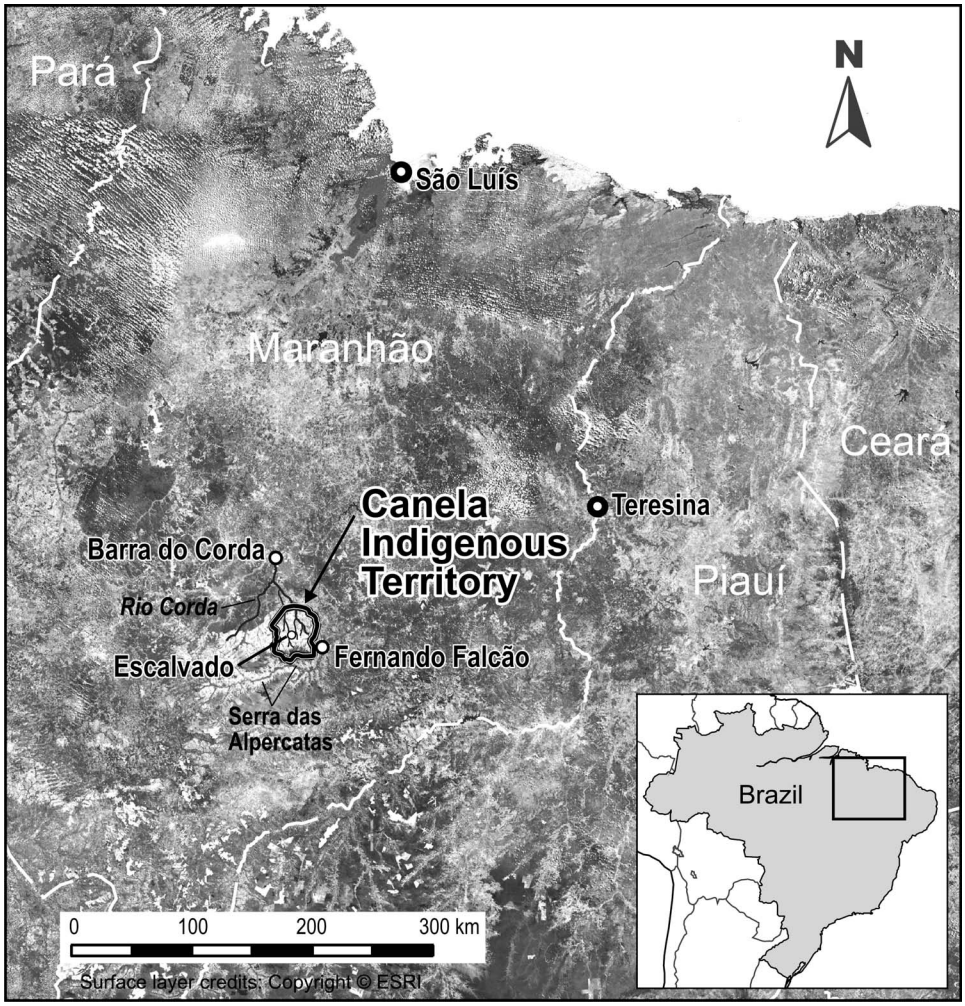


Figure 1. Map of the Canela territory in northeast Brazil.

The Canela in their Cerrado Homeland: Recent Histories of Gardening and Writing

With a population of over 2,100, the Ramkokamekra-Canela[1] indigenous community resides in a legally demarcated territory of 125,212 hectares in the interior of Maranhão state in northeastern Brazil (Instituto Socioambiental 2015; Figure 1). The territory comprises around 5–10% of the land they originally occupied prior to sustained contact with Brazilian colonists at the beginning of the nineteenth century (Crocker 1994:2007). The community speaks an Eastern Timbira language within the Macro-Jê linguistic stock. Almost all community members reside in the main village of Escalvado, which has a concentric circular organization with radial pathways in characteristically Jê and Timbira fashion (Azanha 1984:3).

Downloaded From: https://bioone.org/journals/Journal-of-Ethnobiology on 28 Mar 2024
Terms of Use: https://bioone.org/terms-of-use

The Canela practice a matrilocal residence pattern, with women "owning" the houses and garden plots, although some community members maintain that a married couple jointly "owns" the plots they cultivate. Similar to other Jê, and specifically to Timbira groups, the Canela are known in the ethnographic literature for their socio-political organization led by a council of male elders, elaborate moiety-based rituals, ceremonial log-racing, mythic storytelling, and a traditional trekking-horticulturalist subsistence economy (see Crocker 1990; Heelas 1979; Seeger 1981).

While over half of Maranhão belongs to Brazil's "Legal Amazonia" (*Amazônia Legal*) region, the Canela indigenous territory is located in the Cerrado biome[2]. The largest savannah in the Neotropics, the Cerrado also has the richest flora of the world's savannahs with over 7,000 known species (Klink and Machado 2005:707; Simon and Pennington 2012:711). The diversity of the Cerrado also includes over 70 land systems identified based on climate, landscape, and soils. These include savannah woodlands, closed woodlands known as *cerradão*, grasslands, gallery forests, swampy palm areas, and dry seasonal forests (Felfili et al. 2004:38; Hoffman 2000:63).

The biological and ecological diversity of the Cerrado make it a unique part of Brazil, even rivaling the Amazon in biodiversity (Simon and Pennington 2012:712). Over the past four decades, however, over half of the Cerrado has been converted into large-scale cattle ranching pastures and lands for commercialized agricultural production of soy, among other monocrops (Klink and Machado 2005:707). The Canela territory in particular faces ongoing threats from illegal logging, cattle ranching, industrialized agriculture, and timber production (Rizzo de Oliveira 2005, 2007). Feeley et al. (2009:12383) estimate that habitat loss for native plants in central Maranhão (where the Canela territory is located) will reach between 70–100% by 2050.

Given these alarming statistics, it is important to collect current data on how local communities are interacting with the diverse eco-regions within this threatened biome. While there are numerous studies on indigenous use and management of the Amazon region, less is known about these practices in the Cerrado. Balée's (2013) research among various Tupi-Guaraní-speaking groups in the Amazon sheds light on how past and present indigenous knowledge and environmental management can increase and support biodiversity in quantitative and qualitative ways, through different types of "human-mediated disturbances" of the landscape (Balée 2013:160–164). Several ethnographic and ethnobiological accounts highlight the socio-cultural, socio-economic, ecological, and aesthetic importance of maintaining manioc (*Manihot esculenta* Crantz) diversity in Amazonian communities. Notable studies include Rival (2001) and Rival and McKey (2008) on the Makushi of Guyana, Heckler (2004) and Heckler and Zent (2008) on the Piaroa of Venezuela, and Emperaire and Peroni's (2007) comparative study of manioc cultivation among indigenous groups in the Upper and Middle Rio Negro and Atlantic Forest of Brazil. By contrast, in the Cerrado, only a few studies have focused on indigenous and specifically Jê land management and biodiversity maintenance. These include Posey (1998) and Posey and Plenderleith (2002) on the Kayapó, and Marimon and Felfili (2001) on the Xavante.

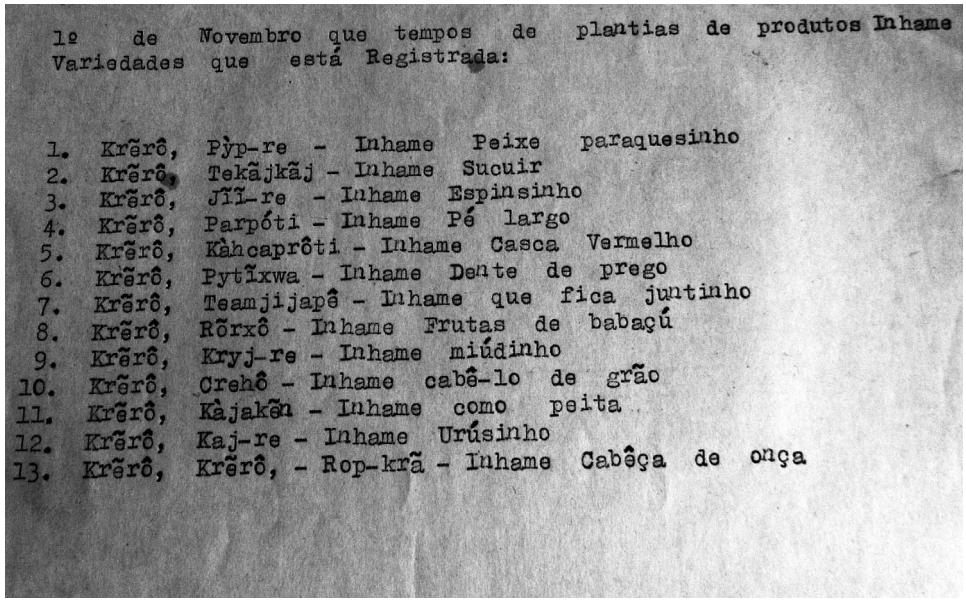
Downloaded From: https://bioone.org/journals/Journal-of-Ethnobiology on 28 Mar 2024
Terms of Use: https://bioone.org/terms-of-use

For the Canela, life unfolds in the Cerrado landscape through daily engagements with the local flora and fauna in diverse eco-regions. Historical records indicate that in the seventeenth and eighteenth centuries, Timbira groups were seminomadic hunter-gatherers who most likely maintained small garden plots throughout the Cerrado biome (Crocker and Crocker 2004:11–12; Nimuendajú 1946:2–5, 59–60). By the early-to-mid twentieth century, however, many communities such as the Canela began to live increasingly sedentary lifestyles in legally circumscribed lands. The modern-day twenty-first century Canela have become subsistence horticulturalists who maintain relatively larger plots (around 1x1 hectares) using slash-and-burn cultivation methods with metal hand tools. My research indicates that the Canela value and appreciate the biodiversity growing in their garden spaces for combined ecological, nutritional, socio-cultural, sociopolitical, cosmological, and aesthetic reasons (Miller 2014, 2015). While hunting and gathering remain occasional subsistence activities, gardening appears to be the primary way that contemporary Canela women and men interact with their Cerrado environment. The community at large admires expert gardeners who maintain large plots with diverse crop species and varieties. This valuation of gardening expertise and biodiversity maintenance has been found among other indigenous cultivators in lowland South America as well, including the Makushi (Rival 2001) and the Piaora (Heckler 2004:246). Thus, relationships between people and cultivated plants have become especially significant in the unfolding Canela life-world, with these engagements emerging from and giving shape to the life-world over time.

In addition to the transformations of the life-world in terms of subsistence over the past two hundred years, linguistic transformations have also taken place. These stem from increased Canela encounters with "outsiders" known as *cupẽn*, meaning non-indigenous "enemies" or "others," and often glossed as *branco/a* ("white person") in Portuguese.[3] In the early 1940s, governmental agents from the SPI (the predecessor of the current National Indian Foundation, FUNAI) established a local schoolhouse where some community members became literate in Portuguese (Devine Guzmán 2013:32). It was not until the late 1960s, however, that Canadian missionaries began documenting the traditionally oral Canela language. From 1968 to 1990, Jack and Josephine Popjes, from the Summer Institute of Linguistics, translated the Bible into Canela and created the first comprehensive grammar of the language (Crocker and Crocker 2004:35; Popjes and Popjes 1986). While no standardized orthography exists for the Canela language, nowadays most young boys and girls attend the village primary school to become literate in their own language and in Portuguese. Many older men (and fewer women) are also literate to varying degrees in Portuguese and Canela.

Within this modern-day context of subsistence and linguistic transformation, as well as increasing threats to the local environment, perhaps it is not surprising that some Canela community leaders and expert gardeners have expressed enthusiasm for documenting their ethnobotanical knowledge in new forms. During my initial visit to the territory in July 2011, I explained my interest in Canela gardening practices to community leaders. The elder Fernando[4] then brought me a list of yam (*Dioscoreaceae* sp.) and other cultivar varietals that he had written prior to my arrival (Figure 2). Fernando wrote the list on the typewriter he obtained years earlier

Downloaded From: https://bioone.org/journals/Journal-of-Ethnobiology on 28 Mar 2024
Terms of Use: https://bioone.org/terms-of-use



1º de Novembro que tempos de plantias de produtos Inhame
Variedades que está Registrada:

1. Krẽrô, Pỳp-re - Inhame Peixe paraquesinho
2. Krẽrô, Tekãjkãj - Inhame Sucuir
3. Krẽrô, Jĩĩ-re - Inhame Espinsinho
4. Krẽrô, Parpóti - Inhame Pé largo
5. Krẽrô, Kàhcaprôti - Inhame Casca Vermelho
6. Krẽrô, Pytĩxwa - Inhame Dente de prego
7. Krẽrô, Teamjijapê - Inhame que fica juntinho
8. Krẽrô, Rõrxô - Inhame Frutas de babaçú
9. Krẽrô, Kryj-re - Inhame miúdinho
10. Krẽrô, Crehô - Inhame cabê-lo de grão
11. Krẽrô, Kàjakẽn - Inhame como peita
12. Krẽrô, Kaj-re - Inhame Urúsinho
13. Krẽrô, Krẽrô, - Rop-krã - Inhame Cabêça de onça

Figure 2. Fernando's original typed list of yam varietals that formed the basis of the "regular yam" (*krẽrô cahàc*) category that the four research assistants and I compiled, July 2011. (Source: Theresa L. Miller)

while working with the anthropologist Dr. William Crocker. The list, he explained, was important for protecting and maintaining the many different crops that gardeners cultivate. Giving me the typed paper list, clearly valuable to him, Fernando implored me to return in order to work on expanding the lists together.

Methods

Given Fernando's enthusiasm, it was clear that compiling ethnobotanical lists would be a central component of my research when I returned for the fieldwork from April 2012 to March 2013. Drawing from his initial lists, I worked primarily with Fernando and three other research assistants (two men and one woman) to compile Canela and Portuguese lists of known cultivated crop species and folk varieties grown in Canela gardens. The term "folk variety" here refers to what Emperaire and Peroni (2007:763) define as a "variety," or "the smallest unit of perception and management of agricultural diversity" that receives a specific name and is the "object of a set of practices and knowledge." The four research assistants and I compiled non-exhaustive lists of native species of trees and other plants, birds, and animals as well. Using these lists as a guide, fourteen individuals (seven males, seven females) also completed quantitative surveys on known seeds, cuttings, and crops currently cultivated, saved, or utilized in the past few years. To compile these data, I employed the principles of ethnobotanical research methods, including freelisting (Martin 2005; Quinlan 2005). Participants were encouraged to list all known species and folk varieties currently or recently saved and cultivated,

Downloaded From: https://bioone.org/journals/Journal-of-Ethnobiology on 28 Mar 2024
Terms of Use: https://bioone.org/terms-of-use

using their own ethno-categories for what they considered specific species or folk varieties of cultivated crops, native trees, and native plants.

I collected qualitative data through formal and informal interviewing of twenty female and male gardeners, including the four main research assistants. These interviews included multiple sessions during which interviewees discussed their garden plot layouts and locations, their horticultural planting, tending, and harvesting techniques in forest and riverbank plots, and their seed saving practices. They also discussed ritual activities involving cultivated crops, food processing techniques, seed exchange both within and outside the community, and shamanic practices in and around the garden. I also engaged in participant observation of planting, cultivation, and harvesting techniques, food processing activities, ritual singing, dancing, and feasting, and everyday activities such as cooking, cleaning, eating, visiting with family, bathing in the stream, and sleeping. I lived with Liliana, my adopted Canela mother and research assistant, and her family, and I participated in and observed many of her household's activities. Finally, with the four main research assistants, I visited garden plots and distinct eco-regions of the territory to document photographically the spectrum of cultivated and wild plants growing in each location. I collected these data through written notes, audio and audio-visual recordings, and photography. All research participants agreed to participate in the study through signing or verbally agreeing (in a taped audio-recording) to a prior informed consent document in Portuguese. The University of Oxford's Central University Research Ethics Committee (CUREC) approved the prior informed consent document before the fieldwork commenced. Through these quantitative and qualitative methods, I was able to catch a glimpse of the Canela life-world and the central role of the plants who reside within it.

In this paper, Canela subsistence activities are referred to as "horticulture" or "gardening" rather than agriculture to underscore the human labor involved (largely without the use of machinery or industrialized pesticides) and the individual human-plant engagements within garden plots. I therefore follow Gurven et al.'s (2010:50) definition of horticulture or "garden cultivation" as "small-scale, low-intensity agricultural production based on human labor inputs and simple tools." I also draw from Clement and Junqueira's (2010:535) understanding of "intensive horticulture" that "differs from agriculture in that plants are treated as individuals rather than populations." This definition highlights the importance of individual gardeners' relationships with individuals or small groups of crop species and folk varieties in their plots, which appear to be a central component of modern-day Canela gardening.

Human-Plant Engagements: Gardener Parents and Crop Children

Canela gardeners, particularly women, frequently visit and tend to their growing crops in the garden space. Individual or groups of women in the matrilocal family visit riverbank gardens near the main village daily and the more distant forest gardens at least once a week. The very act of visiting gardens is thought to promote individual happiness and strength (*ihtỳi*) and overall wellbeing (being or

Downloaded From: https://bioone.org/journals/Journal-of-Ethnobiology on 28 Mar 2024
Terms of Use: https://bioone.org/terms-of-use

becoming *impej*, that which is "good," "beautiful," "true/original"; Miller [2015:172–174; 182–184]). This connection between wellbeing and garden visits has also been found among the Jê-speaking Panará (Ewart 2013:176–179). During these visits, gardeners interact with their growing crops in multi-sensory ways. They remove weeds and handle the growing crops, delicately hanging bean[5] vines on the maize (*Zea mays*) and manioc stalks growing nearby. Sometimes these tending activities involve ritual singing to different crop species and varieties.[6] For example, in January or February, individual female or male gardeners sing the "Squash Song" (*cuhkõn cahàc mã increr-xà*) to their vine crops, including squash (*cuhkõn cahàc*; *Cucurbita sp*.), watermelon (*praxĩ*; *Citrullus lanatus*), sweet potato (*jàt; Ipomoea batatas*), fava bean (*pànkrỳt;* various species), common bean (*pàt juhtõi-re;* various species), and yam, as well as to sweet and bitter manioc. While singing, the gardener suspends the vines in the air. The growing squash, watermelon, and other vined species are said to listen to and become "pleased" with the intimate singing and touching. As my research assistants explain, varietals of squash also enjoy being rubbed with red *urucum* (annatto; *Bixa orellana*) paste while they are growing. These handling activities are said to strengthen the vines and squash fruits, and the song itself "strengthens" and brings "happiness" to the vined crops.

Touching and singing to the growing plants are thought to be essential for the plant's growth and overall "happiness." These embodied, multi-sensory activities are also discussed as ways in which gardeners affectionately care for their plant children. As Fernando explained during a conversation we had in August 2012:

> People take care of plants the same as they do people. If one does not take care [of the plants], the brush overtakes them, and they become very angry and sad, as human children do. Nowadays, the mother uses perfume and has to cut her hair and paint [herself] with *urucum* and *pau de leite* (*Sapium* sp.), and they say that the [crop] child will grow quickly. She paints herself, and they say that it is pure happiness [for the crops]!

Weeding the brush and cleaning the garden space thus appear to be forms of plant childcare that help crops grow "quickly" and become strong. Caring for the crops involves maintaining one's own bodily appearance, painted in a way that gives the crops "happiness," and touching the crops in pleasing ways. Singing is also considered a part of plant childcare. Fernando describes how the growing crops "run" or "walk" toward the singer to listen closely and appreciate the words of the song, which are meant to encourage the plant's growth. Without the gardeners' singing, he explains, the growing plants become sad and weak, thereby making it difficult for them to produce an abundant harvest. The crops "need an owner to take care of them…to sing and clean the garden," Fernando maintains.

Ritually "feeding" the growing crops is another sensory way that gardeners care for their plant children. While it appears that this ritual is performed less frequently than in the past, some families still hold a ritual feast with their crops after they have planted all the seeds and cuttings. Typically, the eldest male of the family and his sons-in-law hunt a forest animal, and the entire matrilocal family then visits the garden together to prepare the feast. Women cook meat-and-manioc *beribu* pies in an earthen oven (*khĩya*). All the crop species and varieties are said to "eat"

Downloaded From: https://bioone.org/journals/Journal-of-Ethnobiology on 28 Mar 2024
Terms of Use: https://bioone.org/terms-of-use

the pies alongside the human family during the meal, and food helps them to grow abundantly.

Thus, through these sensory engagements, Canela parents affectionately care for their plant children. The emphasis on multi-sensory, embodied experiences for gardener mothers and fathers, as well as for crop children, is significant. Both humans and plants are said to "see" each other's presence in garden plots, "taste" the ritual meat pies, "touch" each other through hanging vines and other tending activities, and crops are thought to "hear" the ritual singing of their parents. Fernando assures me that "when cared for well, the crops say, 'our father is taking good care of us and that is why we are going to grow well; we are going to become large for our father.'" A significant component of learning how to garden, therefore, involves developing multi-sensory engagements with a wide array of cultivated crop species and varieties. The community values expert gardeners for the intimate sensory encounters they develop with plants throughout the life cycle. This includes affectionately raising the crop children through touching, feeding, and singing to them, until they are ready to be harvested as mature "adults" at the end of their natural life cycle.

While gardeners' multi-sensory encounters with plants are crucial to crop childcare, shamans also assist in raising crop children. Only shamans who have developed certain perceptual abilities can converse fully with growing plants and plant-people who appear to them in garden spaces. If a bitter manioc root is neglected in the ground or the hot sun, for example, a shaman can hear it crying and complaining that its mother abandoned it. The shaman, Reinaldo, also described how there is a plant-man and plant-woman for every species or variety that have physical characteristics similar to the category they represent. Plant-people appear to be some kind of "master spirits" (Fausto 2008), and they give the shaman instructions and advice on how their representative species or variety should be treated. If the plants and plant-people in many gardens appear to be generally "happy," the shaman returns to the village and assures the male leadership council that the growing crops are "well" and will therefore produce an abundant harvest. Conversely, if there is widespread dissatisfaction among the growing crops, the shaman reprimands the entire village in the ceremonial center and informs individual gardener parents, sometimes passing on specific requests from their own plant children. People maintain that when garden owners consistently fail to clear the plot or pay attention to the crop species and varieties, the growing plants will physically relocate to a better-managed garden, leaving only dry, dead stalks and leaves behind.

Thus, it appears that the shaman's heightened sensory ability to "hear" and "listen" to the plants and plant-people is also essential to successfully raising crop children and ensuring successful harvests. In this sense, active Canela environmental "knowing" (Kohn 2002) involves a series of ongoing, embodied, and multi-sensory encounters between and among a diversity of beings, including gardener parents, plant children, shamans, and plant-people master spirits. That these relationships are grounded in care and affection is perhaps not surprising, given the tendency for indigenous people to develop "intensely respectful emotional engagement[s] with nature" (Hunn 2014:148). Additionally, I suggest that through these multi-sensory encounters, Canela people and cultivated plants are not only

Downloaded From: https://bioone.org/journals/Journal-of-Ethnobiology on 28 Mar 2024
Terms of Use: https://bioone.org/terms-of-use

learning how to know and care for each other, but are also being or becoming with each other in their dynamic life-world. In this sense, Canela people and plants can be considered "companion species" (Haraway 2008:18) to one another, as their lives become intertwined over time and in distinct garden spaces.

Compiling the Living Lists: A New Form of Plant Childcare

The Canela community has a long-standing tradition of orally naming and categorizing their crops. In the 1930s, Nimuendajú (1946:58–61) documented this oral categorization of crop species and a few folk varieties, many of which remain linguistically relevant today. Nearly 90 years later, Fernando approached me with his typewritten list of named crop varietals, and we began our collaboration to compile the ethnobotanical lists in written form. The four main research assistants appeared to enjoy compiling these lists, pouring over the names and spelling of different crop varietals and enthusiastically showing me samples of seeds and cuttings to photograph. We developed a system in which we were frequently revising and expanding these lists, based on their input, as well as that of other gardeners with whom we interacted as a group. Canela gardeners are frequently acquiring new folk varieties through exchange within and outside the village and sometimes appear to "create" new varieties through outcrossing in garden plots (Miller 2015:169–171). The community has experienced considerable losses of crop diversity during certain historical moments as well (Crocker 1990:95). I therefore consider the lists we compiled to be living lists that will undoubtedly change over time to reflect the dynamic relationships between Canela gardeners and various cultivars.

Together, the four main research assistants and I documented 255 cultivars and 53 native tree and plant species, some of which are also cultivated. There may be more cultivars that will be added to these dynamic lists during future research. The research assistants were meticulous about identifying and naming each varietal, and placing it in the correct overarching category and/or sub-category. These categories roughly correspond to Berlin's (1992) taxonomic ranks of "generic," "specific," and "varietal" forms (Table 1). Although I used the Linnaean taxonomic system as a background to the Canela taxonomy, I quickly discovered that the categories do not always directly correspond to one another. For example, the Canela category of *pànkrỳt*, glossed as *fava* in Portuguese, is a "generic" form and includes 52 named "varietals." According to the Linnaean system, however, the category appears to include various species including *Vicia faba*, *Phaseolus vulgaris*, *Phaseolus lunatus*, and other species in the *Phaseolus* genus, as well as species in the *Vigna* genus (Harris, personal communication 2014). This disjunction between the Canela and Western Linnaean categories, while common in ethnobotanical studies (e.g., Berlin 1992), sheds light on the tension between these two ways of knowing about and being with plants in different "ontological" worlds. I explore this disjunction in more detail below.

As is commonly the case with indigenous taxonomies (Ellen 2006), Canela crop names often reference knowledge of and engagements with plants and animals in the Cerrado environment. Some varietal names reference forest game

Downloaded From: https://bioone.org/journals/Journal-of-Ethnobiology on 28 Mar 2024
Terms of Use: https://bioone.org/terms-of-use

Table 1. Select list of Canela plant naming categories.

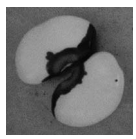
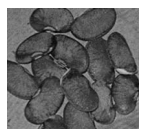
Canela category ("generic")	English translation	Canela sub-category ("specific")	English translation	Number of "varietals"
Põhy	Maize	None	None	13
Pànkrỳt	Fava bean	None	None	52
Pàt juhtõi-re	Common bean	None	None	17
Cuhkõn cahàc	Squash	None	None	8
Jàt	Sweet potato	None	None	15
Caahy	Peanut	None	None	4
Krẽrô	Yam	*Krẽrô pej*	True/original yam	4
		Krẽrô cahàc	Regular yam	14
Kwỳr	Manioc	*Kwỳrỳre*	Sweet manioc	7
		Kwỳr cahàc	Bitter manioc	9
		No one name	Half-sweet/half-bitter manioc	2
Arỳihy	Rice	*Arỳihy kênpei*	Fast-growing rice	14
		Arỳihy kênpôc	Slow-growing rice	14

animals such as "common Cerrado deer fava bean" (*pànkrỳt po cahàc*) and "deer toenail *urucum*" (*po jĩxwa*), both referring to the native Pampas deer (*veado-campeiro*; *Ozotoceros bezoarticus*), and "*ema* shinbone bitter manioc" (*kwỳr mãã tehkà*), which refers to the *ema,* a species of large native bird (*Rhea americana*). Other names reference riverine animals such as tortoises, snakes, and fish. "Tortoise arm bitter manioc" (*kwỳr caprãn jũkee*) resembles a tortoise arm, while "tortoise egg sweet potato" (*jàt caprãn cre*) has a rounded shape similar to a tortoise egg. "Anaconda yam" (*krẽrô tekãjkãj/rorti*) circles around itself as an anaconda does and is associated with water, and "cobra bitter manioc" (*kwỳr awari*) has pulp that resembles false cobra (*Hydrodynastes gigas*) flesh. "*Pỳp* fish yam" (*krẽrô pỳp-re*) is also associated with water and is shaped like an electric eel (fish) native to the Amazon basin region (*poraquê*; *Electrophorus electricus*). A number of crop varietals are named after plants in the surrounding Cerrado landscape as well. "*Capa-re* plant peanut" (*caahy capa-re; Arachis hypogaea*) resembles a type of plant that grows near riverbeds (*capa-re*, unknown species), while "*hônxôti* leaf slow-growing rice" (*arỳihy hônxôti kênpôc; Oryza sativa* or *Oryza glaberrima*) resembles the leaf of a native forest plant (*hônxôti,* unknown species) that appears dried out when it ripens.

In addition, crop names often refer to Canela people during various life stages. Gardeners especially enjoyed discussing the names of fava beans that referred to human characteristics or attributes throughout the life cycle (Table 2). For example, "child fava bean" (*pànkrỳt ahkrare*) has white and black markings and is associated with a child and the umbilical cord, while "red child fava bean" (*pànkrỳt ahkrare caprêc-re*) is white with brilliant reddish-pink markings and was considered especially beautiful by many of the neighbor women near Liliana's house. "Warriors fava bean" (*pànkrỳt mẽhaprãr*) resembles "courageous" male warriors who paint their cheeks with red body paint. "Old people fava bean" (*pànkrỳt mẽhkàa*) is thought to resemble the wrinkled brown skin of elderly Canela. Meanwhile, "large *urucum* fava bean" (*pànkrỳt pyhti*), which is white with purplish-red "lipstick" on one edge, is named after a woman who

Downloaded From: https://bioone.org/journals/Journal-of-Ethnobiology on 28 Mar 2024
Terms of Use: https://bioone.org/terms-of-use

Table 2. Select fava folk varietals that reference human characteristics or attributes.

Canela name	English translation	Taxon	Photograph
Pànkrỳt ahkrare	Child fava bean	*Phaseolus vulgaris*	
Pànkrỳt ahkrare caprêc-re	Red child fava bean	*Phaseolus lunatus*	
Pànkrỳt mẽhaprãr	Warriors fava bean	*Phaseolus vulgaris*	
Pànkrỳt pyhti	Large *urucum* fava bean	*Phaseolus vulgaris*	
Pànkrỳt cupẽkwỳj	White woman fava bean	*Phaseolus vulgaris*	
Pànkrỳt mẽhkàa	Old people fava bean	Unidentified species in *Phaseolus*	

paints her mouth with *urucum* prior to visiting her garden while menstruating. There is even a varietal that is white with red "lipstick" named "white woman fava bean" (*pànkrỳt cupẽkwỳj*), which my research assistants told me looked similar to the white women in the nearby towns.

By identifying fava varietals with Canela people throughout the life course, and by linking manioc, yam, sweet potato, peanut, and other cultivated crop varietals with native Cerrado animals and plants, crop naming appears to be another way for Canela gardeners to intimately understand and engage with the plant children growing in their garden plots. Just as the multi-sensory embodied activities of weeding, tending, keeping gardens tidy, ritually singing, and sharing food with crops are conceptualized as gardener parents affectionately caring for their plant children, ethnobotanical naming can also be considered as crop childcare. Gardener mothers and fathers affectionately name and care for the seeds and cuttings, which are thought of as infants. As Fernando described to me, the seed "is like an infant…the mother takes good care of him and does not let anything bad mistreat him." The seeds and cuttings themselves require certain intimate caring acts, such

Downloaded From: https://bioone.org/journals/Journal-of-Ethnobiology on 28 Mar 2024
Terms of Use: https://bioone.org/terms-of-use

as rubbing with oils, storing in well-kept containers, and naming, in order to be planted and grow into "happy" children who will someday produce abundant harvests.

Discussion: Naming, Writing, and the Transformational Canela Life-World

The childcare of naming and identifying crops is a traditionally oral process, and thus the implications of transforming this process into a written form require some exploration here. While I encouraged the use of pen and paper to document Canela taxonomy for my own research, my research assistants were particularly interested in writing down the varietal names as well. They insisted that I bring each of them paper notebooks and printed versions of our most recent compilations. My four main research assistants also asked me to write out contracts at the beginning of my fieldwork in order to make their work with me official. I hand-wrote these contracts on paper with actual carbon copies, as they wanted these for their records. Indeed, written documents in general are accorded with special meaning, and some community members actively seek out writing activities on their own. For example, Crocker (personal communication; 2007:34) recounts how one of his research assistants in the 1960s began writing a diary of his daily life without being prompted, which would form the basis of the decades-long diary program Crocker later developed. This is similar to my experience with Fernando, who approached me with his plants list before I had even begun my research on the topic.

The materials used to create these ethnobotanical lists may provide insights into the written lists' meaning and value for Canela gardeners. Paper and pens are valuable commodities, for they are relatively expensive and must be purchased in the non-indigenous or *cupẽn* town of Barra do Corda located 65 km from Escalvado village. Mythic-historical and present-day encounters between the Canela, who refer to themselves as *mẽhĩn* (meaning "people;" literally *mẽ* = plural form + *hĩn* = flesh), and the *cupẽn* are marked by violence, socio-economic and socio-political inequality, and continued dependence on their non-indigenous neighbors for governmental services such as healthcare and social assistance payments, transportation, cattle, and manufactured goods. This division between the *mẽhĩn* and the *cupẽn* has become a key opposition in the Canela conceptualization of their life-world and its distinctiveness from other ways of knowing and being, similar to Ewart's (2013:23) description of the Jê-speaking Panará division between themselves and the *hipe* (also translated as "enemy/others/white people"). Similar to other manufactured items purchased in town, such as cloth, cooking oil, coffee, salt, and bread, the materials of pen and paper are associated with the "enemy" or "other" *cupẽn*. The written Canela language is also a product of foreign or *cupẽn* missionaries, and I, a "white woman" (*cupẽkwỳj*), assisted and encouraged the creation of the written plants lists.

Rather than remaining "outside" materials, however, the written language and the tools of paper and pen were co-opted and transformed by my research assistants (and by extension the community at large) to further understand their own *mẽhĩn* conceptualizations of the native Cerrado environment and of the broader unfolding life-world. This transformation of "outside" elements into the

Downloaded From: https://bioone.org/journals/Journal-of-Ethnobiology on 28 Mar 2024
Terms of Use: https://bioone.org/terms-of-use



Figure 3. Liliana and her family, both older and younger generations, look through the photographs that accompanied the ethnobotanical booklet I gave to the community, February 2013. (Photograph: Theresa L. Miller)

"inside" is common among Jê-speaking communities in central and northeast Brazil (Gordon 2006; Ewart 2013:232). The Canela approach to transformation and change appears similar to that of the Panará, for whom these elements are an inherent part of sociality (Ewart 2013:232). Throughout the twentieth century, the Canela have incorporated (or been forced to incorporate [Devine Guzmán 2013:34]) writing into their daily lives—first in Portuguese, then in Canela. Although these techniques and materials are still associated with outsiders, the Canela have been transforming the value and meaning of writing to themselves, through writing the unprompted diaries, typewritten plants lists, and now the ethnobotanical lists we compiled. Thus, these lists form part of the contemporary Canela life-world, one that is highly transformational and open to incorporation of things that are initially considered outside of it.

The gardeners with whom I worked sought out and valued the written lists as a transformation of the plant childcare the community has been performing for centuries, if not longer. This new and innovative way to care for their plant children was also seen as an important new teaching tool for the human children in their families. Community members seemed pleased with the ethnobotanical booklets (including photographs and names and descriptions in Canela and Portuguese) I gave to research assistants and the primary school at the end of the fieldwork (Figure 3). The booklets are the first of their kind for the Canela community, and Liliana expressed the importance of these written lists during a conversation in February 2013:

> This book [of ethnobotanical lists] that you prepared; I am going to read all of it. I will never leave this work that you did. I will remember all the time; I will pass it on to my grandchildren. It could be that I become a little

Downloaded From: https://bioone.org/journals/Journal-of-Ethnobiology on 28 Mar 2024
Terms of Use: https://bioone.org/terms-of-use

> old lady, but I will pass it on to those who are interested…our research is very important! You are seeing my case; that we always lack something, [even though] I always try. I cannot lose the [crops] that you photographed…I want to increase what I cultivate!

Clearly, Liliana sees the written lists as a way to transmit ethnobotanical knowledge to the younger generation of Canela gardeners, and as a way to maintain and even increase the diversity of her garden plots. In this sense, the written lists as they have emerged through various encounters with people and things "outside" the life-world provide a new and innovative way to keep the diverse crop children "alive" and "protected" as members of their "inside" community. As Liliana states, she still feels she "always lacks something" in her garden plots, and other community members such as Fernando also lament the loss of certain crops such as gourd varietals (types of *cuhkõn* and *cuhtõj; Cucurbita sp*.). Documenting the names for these varietals, then, provides a new and valued way for Canela gardeners to better care for the diversity of their crop children.

Conclusion: The Usefulness of "Ontological Frictions"

Conceptualizing the creation of the living lists as a transformative activity for Canela gardeners does not imply a complete resolution of the tensions that emerge between indigenous active knowing about plants and a written system of Linnaean-inspired taxonomic classification, however. The Canela category of fava bean (*pànkrỳt*), for example, encompasses multiple genera and species in the Linnaean system. Canela gardeners also divide rice varietals into "fast-growing" (*kênpei*) and "slow-growing" (*kênpôc*) types, and yam varietals into "regular" (*cahàc*) and "true/original" (*pej*) categories (Table 1), which have combined aesthetic, moral, and cosmological connotations that are not accounted for fully in a Western taxonomy.

Moreover, this epistemological tension is also arguably an ontological one, in that the indigenous Canela and "Western" Linnaean ways of knowing about plants also involve distinct processes of world-making and "becoming worldly" (Haraway 2008:3) with plants. Thus, the lists' focus on highly categorized and defined human knowledge about and engagements with plants does not capture much of the fluid ways of knowing about and being with cultivated crops that girls and boys, women and men develop through the caring, affectionate encounters described above. For example, the written name for "cobra bitter manioc" (*kwỳr awari*) indicates to a novice Canela gardener that the pulp of this varietal resembles false cobra flesh. The name alone, however, does not tell her that the varietal produces a beautiful yellow *farinha* (toasted manioc flour), nor does it indicate how growing bitter manioc children need to consume meat in the food sharing ritual. Nor does the varietal's name explain how "Cobra Bitter Manioc-Woman" appears to shamans with beautiful bright-red bracelets around her arms similar to the varietal's red leaves and stick. These multi-sensory experiences of processing the manioc, eating meat alongside the crop children, and listening to shamanic experiences with plant-people cannot be captured fully in a written list, because they emerge over time through embodied encounters among diverse human and plant beings.

Downloaded From: https://bioone.org/journals/Journal-of-Ethnobiology on 28 Mar 2024
Terms of Use: https://bioone.org/terms-of-use

The tensions that arise between these two different forms of knowledge—and world—making do not appear to be incommensurable for Canela gardeners. Rather, my research assistants and other community members appeared to value both forms of coming to know and be with local plants, and they were able to incorporate the more "Western" list-making from the "outside" into their own transformational life-world. While the codified lists left out important sensory experiences, creating the lists was a fluid, dynamic, and contingent process. The lists are not finished, but rather continue to live and grow through naming and documenting significant plants in the Canela life-world.

Although the "orthodoxy" of written documentation replacing indigenous oral knowledge is a real danger in some contexts (Goody 2004:94), this does not seem to be the case with the Canela. Instead, Canela gardeners are approaching their list-making in similar ways as Western taxonomists themselves. As Hartigan (2015a:70) points out, while social theorists often describe taxonomy as "tyrannically steering [life-forms] into tiny boxes," taxonomists are "continually open to new data and new visions." Other recent works also highlight the overlapping ways of knowing about plants in both traditional and modern industrialized communities. Notable studies include Rival's (2014) comparative study on conceptualizations of environmental knowledge among the Huaorani of Ecuador, the Makushi of Guyana, and Western natural scientists, and Hartigan's (2015b) study of the caring relationships that emerge among people and plants in three Spanish botanical gardens. Recognizing and working through the tensions among disparate ways of knowing can be a "fruitful" exercise, as Vergunst et al. (2012:12) point out in studies of human-landscape interactions.

The "ontological frictions" that arise when diverse systems of plant knowledge come into contact can lead to interesting ways forward for ethnobotany as a whole (Ellen this issue). For the Canela, these useful "frictions" arise not only between ways of knowing about plants, but more fundamentally between different ways of being or "becoming" (Ingold and Pálsson 2013) humans and plants in distinct worlds. These worlds may overlap at certain points, as we have seen with the Canela incorporation and transformation of lists from the "outside" world, and it is within these gaps that new knowing and new ways of becoming can perhaps occur.

The usefulness of these ontological tensions have theoretical as well as practical applications, especially in the Canela case where rapid rates of deforestation threaten their distinct ways of knowing and becoming alongside the plants in the local Cerrado environment. These written lists provide a new, concrete tool that the women and men can use, alongside other more traditional techniques, to teach the younger generations about engaging in affectionate, caring relationships with cultivated crops. Although not understood in terms of conservation of plant objects, the written lists may assist with biodiversity management in the threatened biome by drawing from distinctly Canela notions of plant childcare. Whether this caring, affectionate approach to biodiversity management is relevant to other indigenous communities in the Cerrado and Amazon regions, and elsewhere, is the subject of further research, and can perhaps provide new avenues to halt the loss of valuable plants and human-plant engagements throughout the world.

Downloaded From: https://bioone.org/journals/Journal-of-Ethnobiology on 28 Mar 2024
Terms of Use: https://bioone.org/terms-of-use

Finally, the Canela case can lead to further research on how cultivated plants come to know and "become with" their human counterparts or "messmates" (Haraway 2008:16–17). Many recent studies have focused on how humans "become worldly" with other species, including dogs (Haraway 2008), dengue mosquitoes (Nading 2014), and mushrooms (Tsing 2010), to name a few. To better understand Canela-plant engagements, the next steps involve finding ways of "interviewing" the plants themselves (Hartigan et al. 2014). How plants behave in and "know" their environments has become a significant area of research for botanists and biologists in recent years (see Anathaswamy 2014; Chamovitz 2012). Anthropologists such as Kohn (2013:1) have also recently questioned the processes of "seeing, representing, and perhaps knowing, even thinking" as "not exclusively human affairs." As the study of human-plant relationships with "frictions at its heart" (Ellen this issue), ethnobotany is the ideal realm in which to put forward these types of questions. For the Canela, the question then becomes, what can fava beans, yam, manioc, and other crop species and varieties tell us about themselves and their encounters with their human parents?

Notes

[1] The Ramkokamekra-Canela share the same language and sociocultural traits as the neighboring Apaniekra-Canela, but each community considers itself a distinct group and occupies a distinct territory. In this paper, the term "Canela" refers to the Ramkokamekra-Canela, following Crocker's (1990, 1994, 2007) usage of the term. The exact origin of the name "Canela" is unknown, but by the early nineteenth century, local Brazilian authorities were commonly using this term to refer to the ethnic group (Crocker and Crocker 2004:12–13). Nowadays, the Canela refer to themselves as "Canela," "Ramkokamekra," or "*mẽhĩn*" (*mẽ* = plural form and *hĩn* = "flesh") which translates as "people" in their language.

[2] The Cerrado (with a capital "C") refers to the entire biome, which comprises approximately twenty-two percent of Brazil's territory (Jepson 2005:99). Within the Cerrado biome, the "*cerrado sensu lato*" eco-region is the "dominant savannah vegetation type" (Simon and Pennington 2012:712) and includes savannah woodlands or "*cerrado sensu stricto*," as well as other land types (Felfili et al. 2004:38; Hoffman 2000:63).

[3] Following other ethnographies of lowland South America (e.g., Albert and Ramos 2002), the term *branco/a* or "white person" here refers not to a specific skin color, but rather serves as a gloss referring to the category of non-indigenous Brazilians or foreigners. As is common with indigenous communities in Brazil, the Canela use the terms *cupẽn* and *branco/a* interchangeably.

[4] Names have been changed from their originals.

[5] The term "bean" refers to both of the Canela categories of *pàt juhtõi-re* and *pànkrỳt*. The category of *pàt juhtõi-re* is translated as "common bean" in English (*fejão* in Portuguese) and consists of the species *Phaseolus vulgaris* and *Cajanus cajan*. The category of *pànkrỳt* is translated as "fava bean" in English (*fava* in Portuguese) and consists of various species in the *Phaseolus* genus, including *Phaseolus vulgaris*, *Phaseolus lunatus*, species in the *Vigna* genus, and *Vicia faba*.

Downloaded From: https://bioone.org/journals/Journal-of-Ethnobiology on 28 Mar 2024
Terms of Use: https://bioone.org/terms-of-use

[6] There are various ritual songs (*cânticos* in Portuguese) associated with many different crop species that can be sung individually in garden plots or as part of communal festival periods. For more information on ritual songs and the Canela annual ritual cycle, see Miller (2015:119–125, 228–232) and Crocker (1990:269–321).

Acknowledgments

Funding for the doctoral fieldwork was provided by the Rausing Scholarship from the University of Oxford's Institute of Social and Cultural Anthropology and Linacre College, the Jacobs Research Funds from the University of Washington-Whatcom Museum, and the BioSocial Society. Special thanks goes to my doctoral supervisor at the University of Oxford, Dr. Laura Rival, my Brazilian supervisor Dr. Carlos Fausto from the Federal University of Rio de Janeiro, and Dr. William Crocker from the Smithsonian Institution's National Museum of Natural History for their support throughout the fieldwork and dissertation writing. I thank Dr. Stephen Harris, Department of Plant Sciences, University of Oxford, for identifying the species and genera of the *pànkrỳt* and *pàt juhtõi-re* categories of beans during a meeting in May 2014. Thanks also goes to the three anonymous reviewers for their detailed reading and helpful commentary. Finally, I especially thank the Canela research assistants and the community at large for their curiosity, creativity, and enthusiasm for gardening and plant childcare.

References Cited

Albert, B., and A. R. Ramos, eds. 2002. *Pacificando o Branco: Cosmologias do Contato no Norte-Amazônico*. Editora UNESP, São Paulo, Brazil.

Anathaswamy, A. 2014. Roots of Consciousness. *New Scientist* 224 (2998):34–37.

Azanha, G. 1984. A Forma "Timbira:" Estrutura e Resistência. Unpublished Master's Thesis, Department of Social Sciences, University of São Paulo, São Paulo, Brazil.

Balée, W. 2013. *Cultural Forests of the Amazon: A Historical Ecology of People and their Landscapes*. University of Alabama Press, Tuscaloosa, AL.

Berlin, B. 1992. *Ethnobiological Classification: Principles of Categorization of Plants and Animals in Traditional Societies*. Princeton University Press, Princeton, NJ.

Candea, M. 2010. Debate: Ontology is Just Another Word for Culture. *Critique of Anthropology* 30:172–179.

Chamovitz, D. 2012. *What a Plant Knows: A Field Guide to the Senses*. Scientific American / Farrar, Straus, and Giroux, New York, NY.

Clement, C., and A. B. Junqueira. 2010. Between a Pristine Myth and an Impoverished Future. *Biotropica* 42:534–536.

Crocker, W. 1990. *The Canela (Eastern Timbira). I, an Ethnographic Introduction: Smithsonian Contributions to Anthropology (33)*. Smithsonian Institution Press, Washington, D.C.

Crocker, W. 1994. Canela. In *Encyclopedia of World Cultures*, edited by J. Wilburt, pp. 94–98. G.K. Hall & Company, New York, NY.

Crocker, W. 2007. The Canela Diaries: Their Nature, Uses, and Future. *Tipití* 5:33–57.

Crocker, W. 2015. Personal communication. Department of Anthropology, National Museum of Natural History, Smithsonian Institution, Washington, DC.

Crocker, W., and J. Crocker. 2004. *The Canela: Kinship, Ritual, and Sex in an Amazonian Tribe*, edited by G. Spindler. Wadsworth/Thomson Learning, Belmont, CA.

Devine Guzmán, T. 2013. *Native and National in Brazil: Indigeneity after Independence*. University of North Carolina Press, Chapel Hill, NC.

Ellen, R. F. 2006. Introduction: Ethnobiology and the Science of Humankind. *Journal of the Royal Anthropological Institute* 12 (Supplement):S1–S22.

Emperaire, L., and N. Peroni. 2007. Traditional Management of Agrobiodiversity in Brazil: A Case Study of Manioc. *Human Ecology* 35:761–768.

Ewart, E. 2013. *Space and Society in Central Brazil: A Panará Ethnography*. Bloomsbury, London, United Kingdom.

Fausto, C. 2008. Donos Demais: Maestria e Domínio na Amazônia. *Mana* 14:329–366.

Feeley, K. J., M. R. Silman, and H. A. Mooney. 2009. Extinction Risks of Amazonian Plant Species. *Proceedings of the National Academy of Sciences of the United States of America* 106: 12382–12387.

Downloaded From: https://bioone.org/journals/Journal-of-Ethnobiology on 28 Mar 2024
Terms of Use: https://bioone.org/terms-of-use

Felfili, J. M., M. C. da Silva Júnior, A. C. Sevilha, C. W. Fagg, B. M. Teles Walter, P. E. Nogueira, and A. V. Rezende. 2004. Diversity, Floristic and Structural Patterns of Cerrado Vegetation in Central Brazil. *Plant Ecology* 175:37–46.

Goody, J. 2004. The Transcription of Oral Heritage. *Museum International* 56:91–96.

Gordon, C. 2006. *Economia Selvagem: Ritual e Mercadoria entre os Xikrin-Mebêngôkre*. Editora UNESP, São Paulo, Brazil.

Gurven, M., M. Borgerhoff Mulder, P. L. Hooper, H. Kaplan, R. Quinlan, R. Sear, E. Schniter, C. von Rueden, S. Bowles, T. Hertz, and A. Bell. 2010. Domestication Alone Does Not Lead to Inequality: Intergenerational Wealth Transmission among Horticulturalists. *Current Anthropology* 51:49–64.

Haraway, D. 2008. *When Species Meet.* University of Minnesota Press, Minneapolis, MN.

Harris, S. 2014. Personal Communication. Department of Plant Sciences, University of Oxford, Oxford, United Kingdom.

Hartigan, J. 2015a. *Aesop's Anthropology: A Multispecies Approach.* University of Minnesota Press, Minneapolis, MN.

Hartigan, J. 2015b. Plant Publics: Multispecies Relating in Spanish Botanical Gardens. *Anthropological Quarterly* 88:481–507.

Hartigan, J., E. Seccombe, and E. Kirksey. 2014. The Multispecies Salon Presents: How to Interview a Plant. Available at: http://www.multispecies-salon.org/how-to-interview-a-plant/. Accessed on December 29, 2014.

Heckler, S. 2004. Tedium and Creativity: The Valorization of Manioc Cultivation and Piaroa Women. *The Journal of the Royal Anthropological Institute* 10:241–259.

Heckler, S., and S. Zent. 2008. Piaroa Manioc varietals: Hyperdiversity or Social Currency? *Human Ecology* 36:679–697.

Heelas, R. H. 1979. Social Organization of the Panará, a Gê Tribe of Central Brazil. Unpublished Doctoral Dissertation, Institute of Social and Cultural Anthropology, University of Oxford, Oxford, United Kingdom.

Hoffman, W. A. 2000. Post-Establishment Seedling Success in the Brazilian Cerrado: A Comparison of Savanna and Forest Species. *Biotropica* 32:62–69.

Hunn, E. 2014. To Know Them is to Love Them. *Ethnobiology Letters* 5:146–150.

Ingold, T., and G. Pálsson, eds. 2013. *Biosocial Becomings: Integrating Social and Biological Anthropology.* Cambridge University Press, Cambridge.

Instituto Socioambiental. 2015. De Olho nas Terras Indígenas. Available at: http://ti.socioambiental.org/pt-br/#. Accessed on July 11, 2015.

Jepson, W. 2005. A Disappearing Biome?: Reconsidering Land-Cover Change in the Brazilian Savanna. *The Geographical Journal* 171:99–111.

Klink, C. A., and R. B. Machado. 2005. Conservation of the Brazilian Cerrado. *Conservation Biology* 19:707–713.

Kohn, E. 2002. Natural Engagements and Ecological Aesthetics among the Ávila Runa of Amazonian Ecuador. Unpublished Doctoral Dissertation, Department of Anthropology, University of Wisconsin-Madison, Madison, Wisconsin.

Kohn, E. 2013. *How Forests Think: Toward an Anthropology beyond the Human.* University of California Press, Berkeley, California.

Marimon, B. S., and J. M. Felfili. 2001. Ethnobotanical Comparison of "Pau Brasil" (*Brosimum rubescens* Taub.) Forests in a Xavante Indian and a Non-Xavante Community in Eastern Mato Grosso State, Brazil. *Economic Botany* 55:555–569.

Martin, G. J. 2004. *Ethnobotany. A Methods Manual.* Earthscan, London, United Kingdom.

Miller, T. 2014. Valuing Varietal Diversity: Indigenous Canela Horticulture in Northeast Brazil. *Society, Biology & Human Affairs* 78:62–82.

Miller, T. 2015. Bio-Sociocultural Aesthetics: Indigenous Ramkokamekra-Canela Gardening Practices and Varietal Diversity in Maranhão, Brazil. Unpublished Doctoral Dissertation, Institute of Social and Cultural Anthropology, University of Oxford, Oxford, United Kingdom.

Nading, A. 2014. Dengue Mosquitoes are Single Mothers: Biopolitics Meets Ecological Aesthetics in Nicaraguan Community Health Work. *Cultural Anthropology* 27:572–596.

Nimuendajú, C. 1946. *The Eastern Timbira*. University of California Press, Berkeley, CA.

Popjes, J., and J. Popjes. 1986. Canela-Krahô. In *Handbook of Amazonian Languages*, edited by D. C. Derbyshire and G. K. Pullum, pp. 128–199. Walter de Gruyter & Co, New York, NY.

Posey, D. 1998. Diachronic Ecotones and Anthropogenic Landscapes in Amazonia: Contesting the Consciousness of Conservation. In *Advances in Historical Ecology,* edited by W. Balée, pp. 104–118. Columbia University Press, New York, NY.

Posey, D. A., and K. Plenderleith. 2002. *Kayapó Ethnoecology and Culture*. Routledge, London, United Kingdom.

Downloaded From: https://bioone.org/journals/Journal-of-Ethnobiology on 28 Mar 2024
Terms of Use: https://bioone.org/terms-of-use

Quinlan, M. 2005. Considerations for Collecting Freelists in the Field: Examples from Ethobotany. *Field Methods* 17:219–234.

Rival, L. 2001. Seed and Clone: The Symbolic and Social Significance of Bitter Manioc Cultivation. In *Beyond the Visible and the Material: The Amerindianization of Society in the Work of Peter Rivière*, edited by L. Rival, pp. 57–80. Oxford University Press, Oxford, United Kingdom.

Rival, L. 2014. Encountering Nature through Fieldwork: Expert Knowledge, Modes of Reasoning, and Local Creativity. *Journal of the Royal Anthropological Institute* 20:218–236.

Rival, L., and D. McKey. 2008. Domestication and Diversity in Manioc (*Manihot esculenta* Crantz ssp. *esculenta*, Euphorbiaceae). *Current Anthropology* 49:1119–1128.

Rizzo de Oliveira, A. L. 2005. Projeto Carajás, Práticas Indigenistas e Povos Indígenas no Maranhão. *Revista Anthropológicas* 15:135–169.

Rizzo de Oliveira, A. L. 2007. Messianismo Canela: Entre o Indigenismo e o Desenvolvimento. *Revista Anthropológicas* 18:183–214.

Seeger, A. 1981. *Nature and Society in Central Brazil: The Suya Indians of Mato Grosso*. Harvard University Press, London, United Kingdom.

Simon, M. F., and T. Pennington. 2012. Evidence for Adaptation to Fire Regimes in the Tropical Savannas of the Brazilian Cerrado. *International Journal of Plant Sciences* 173:711–723.

Tsing, A. 2010. Arts of Inclusion, or How to Love a Mushroom. *Manoa* 22:191–203.

Vergunst, J., A. Whitehouse, N. Ellison, and A. Árnason. 2012. Introduction. In *Landscapes Beyond Land: Routes, Aesthetics, Narratives*, edited by A. Árnason, N. Ellison, J. Vergunst, and A. Whitehouse, pp. 1–14. Berghahn, Oxford, United Kingdom.

Downloaded From: https://bioone.org/journals/Journal-of-Ethnobiology on 28 Mar 2024
Terms of Use: https://bioone.org/terms-of-use