

“Building Blood”: An Ethnographic Look at Plants in Medicine and Myth among the Mopan Maya of San José, Belize

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Abstract. *In this study, we discuss how the Mopan Maya of Belize attribute certain diseases to an indigenous understanding of human blood properties. We further describe how specific plants are said to affect the quality or nature of blood and the native ethnobotanical methods used to moderately “strengthen” or “build” blood. Furthermore, we investigate emic Mopan concepts of wellness and disease embedded in their understanding of blood and the necessity to maintain an equilibrium within their blood by using forest botanicals. In addition, we detail the use of various medicinal plants by the Mopan in treating specific categories of physical and ethnopsychiatric disorders.*

Keywords. *ethnobotany, medicine, Mopan Maya, Belize, plant use*



Traditional exploitation of botanical resources by Mopan Maya of San José, Belize, provides a significant portion of their food, medicine, and raw materials for daily life. In this study based primarily on fieldwork data, we detail the use of forest botanicals by the Mopan Maya for ritual and medicinal purposes. The Mopan attribute certain diseases to an indigenous understanding of human blood properties. For example, they believe specific plants affect the quality or nature of blood (i.e., it being too “sweet,” “strong,” “weak”). They have local concepts of ways to moderately “strengthen” or “build” blood through plant use. As we describe below, these emic Mopan Maya concepts of wellness and disease are intimately related to maintaining a perceived equilibrium in blood.

Background

Mopan Maya communities are dispersed across parts of the southern Petén in Guatemala and various locales in southern Belize such as San Antonio, Blue Creek, Pueblo Viejo, and San José (Figure 1) (The Maya People of Southern Belize, The Toledo Maya Cultural Council and The Toledo Alcaldes Association 1997). Mopan Mayan is part of the Yucatekan branch of Mayan languages and is partially or mutually intelligible with Itzaj, Lakandon, and Yucatek. According to the 2010 census by the Belizean government, there are 10,649 Mopan speakers (Statistical Institute of Belize 2010); however, Grimes (2000) places the number of Mopan speakers at between 6,000 and 8,000. The Mopan Maya of Belize occupy regions of the Maya Mountains characterized by montane and sub-montane broadleaf forests and pine savannas (Figure 2). Belize boasts over 700 species of native trees (Mallan 1993) and over 3,400 species of vascular flora, a stunning diversity for a country of fewer than 23,000 km². The Mopan rely upon many botanical resources for both consumption and commercial resale (see Table 1).

The Mopan identify two plant community types: “high forest” and “low forest.” Rather than being elevation markers, “low forest” is applied to plant communities growing on land degraded by housing or repeated swidden-fallow use and where mature regrowth is often never reached. On the other hand, “high forest” refers to plants that grow in virgin or old-growth tropical forests that have not been cut for farming and houses. Much of the land near the village of San José, where we did most of our fieldwork (Figure 3), has been logged, farmed, or cut for housing or *milpas* (cornfields) in recent years. In this case, “high forest” usually refers to land several kilometers from the center of town, specifically the Columbia River Forest Reserve.

Study Location

San José is located in the Toledo District (Figure 1), a section of Belize covered with pine savannas, swamps and rivers, and open plains. The Maya Mountains, which rise to over 1,000 m, runs through this region as the mountain range crosses over into Guatemala. San José (16°15'58" North, 89°5'42" West) straddles the Columbia River Forest Reserve, which contains 39,616 hectares of old-growth broadleaf forest, pine savanna, and montane forest that represents one of the largest protected bio-reserves in Central America. Hunters in San José frequent the Columbia River Forest Reserve for animals only found in mature forests, such as the white-lipped peccary (*Tayassu*

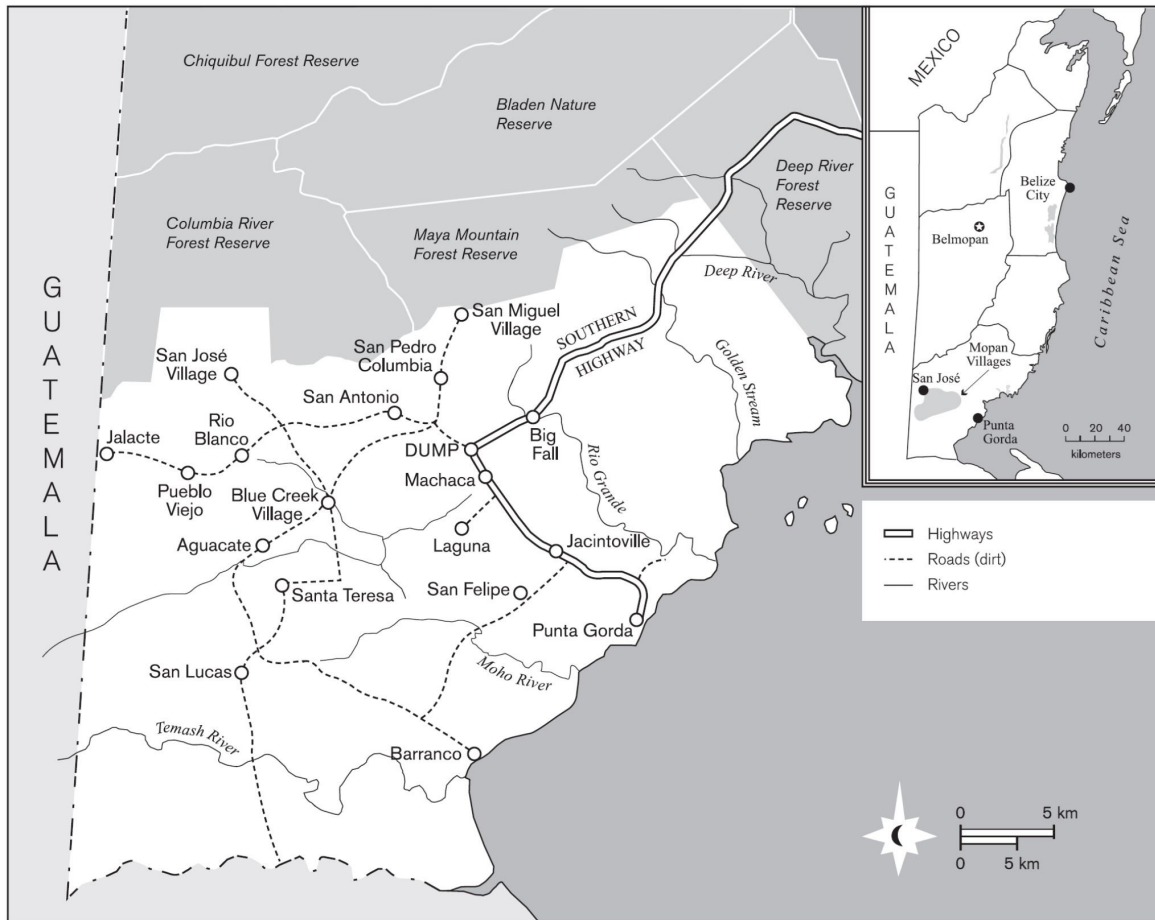


Figure 1. Map of southern Belize and Mopan-speaking communities.

pecari, red brocket deer (*Mazama americana*), crested guan (*Penelope purpurascens*), and great curassow (*Crax rubra*) (Steinberg 1997:134).

There are distinct plant species in the “high forest” according to the Mopan, such as the (*aj*)-*mánaax* “mountain (wild) cherry,” the *xilil* (*Ardicia paschalis*) “marlberry,” the *poxte*’ (*Annona Scleroderma*) “hard-shell custard apple,” or *k’ánaab*’ (*Lonchocarpus castilloi*) “cabbage bark tree.” The Mopan use plants from both low and high forests in traditional methods of healing, but many plants important to healers are found only in the old-growth high forests.

Previous Research

Early studies on the ethnobotany of Belize such as Standley (1936) and Thompson (1930) led to more detailed research in beginning in the 1980s, principally among the Mopan and Q’eqchi’ Maya populations (Arnason et al. 1980; Arvigo et al. 1994; Balick et al. 1996; Bourbonnas-Spear et

al. 2005; Blanco and Thiagarajan 2017; Fernandez 1990; Walsh 2003), including economic value of ethnobotanical medicines in Belize (Balick and Mendelsohn 1992). A significant amount of ethnobotanical research has been done among the Q'eqchi' Maya (Amiguet et al. 2006; Bourbonnais-Spear 1993; Michel et al. 2007; Theil and Quinlan 2020; Waldram et al. 2009; Walsh et al. 2019; Zargar 2002). One of the fuller treatments of ethnobotanical medicines used across Belize is Arvigo and Balick (1993). Larger projects (Bridgewater 2012; Jolly and McRae 1998) have described the stunning biodiversity and natural history of Belize. Several studies have looked beyond the Maya to the medicinal use of plants among Garifuna populations (Santos n.d.; Arzu and McRae 2016), data that often show overlap in use with the two main Maya populations in Belize, the Mopan and the Q'eqchi'. While some studies have focused on particular Maya villages in Belize, such as San Jose Succutz (Arnason et al. 1980), our study is distinguished by being centered in the village of San José and for concentrating on indigenous notions of 'blood-building' in relation to plants used as food, drink, and medicines.

Methods

Methods of Data Collection on Medicinal Uses of Plants

We used consensus methodology, whereby we interviewed a large number of individuals to ascertain broad consensus on plant identification and use (cf. Trotter and Logan 1986), to conduct an ethnobotanical study for ten days in and around the Mopan Maya village of San José, Belize, in 2014, supplemented by data collected by Kerry Hull among the Mopan in 2002, 2005, and 2009. In



Figure 2. The Maya Mountains of Belize (photo by Mark Wright).

Mopan Name	Scientific Name	Vernacular Name
(aj)-säk ch 'ib' / ch 'ib'	<i>Chamaedora pinnatifrons</i>	pacaya
'ab 'äl	<i>Spondias purpurea</i>	summer plum, red mombin
'ib'	<i>Phaseolus</i> spp.	bean
'ik	<i>Capsicum</i> spp.	chili
'on	<i>Persea americana</i>	avocado
'oop	<i>Annona reticulata</i>	wild custard apple, annona
'oox	<i>Brosimum alicastrum</i>	breadfruit, breadnut, ramon
b 'u 'ul	Fabaceae	bean
cha 'yu 'uk'	<i>Amaranthus dubius</i>	amaranth
chäkäl ja 'as	<i>Pouteria sapota</i>	mamey
chi'	<i>Byrsonima crassifolia</i>	nance
ixi 'im	<i>Zea mays</i>	corn
k 'uum	<i>cucurbita moschata</i>	squash
käkäw	<i>Theobroma cacao</i>	cacao
käla'	<i>Carludovica palmate, Sabal mexicana</i>	jippi jappa
masapan	<i>Artocarpus altilis</i>	breadfruit
päjpäjchína	<i>Citrus aurantium</i>	bitter orange
pätaj	<i>Psidium guajava</i>	guava
päyak'	<i>Dioscorea batatas</i>	yam
put	<i>Carica papaya</i>	papaya
tutz	<i>Orbigyna cohune</i>	cohune palm
tz 'iin	<i>Manihot esculenta</i>	casava
tzäpây / tzäpuy	<i>Thevetia ahouai</i>	dog testicles tree
wanaabe	<i>Annona muricata</i>	soursop

Table 1. Examples of plant and fruits consumed by the Mopan Maya in Belize.

2014, we conducted semi-structured, individual interviews with native Mopan consultants during excursions to farmlands in low and high forest areas. We interviewed eight native Mopan speakers, all of whom were males between 50 and 75. In 2002 and 2009, Kerry Hull conducted interviews in San José and neighboring villages; he interviewed more than 25 Mopan speakers, both male and female, between 21 and 88, four of whom were traditional healers. Over 90% of our consultants were native to the general region in which we interviewed them, and all of our San José consultants were born in that village.

We collected no voucher specimens (pressed plant samples). Instead, we used methods appropriate for this ethnographically and linguistically driven study. There have already been excellent botanical studies involving voucher specimens in Belize (Arvigo and Balick 1993; Bourbonnas-Spear et al. 2005; Nations 2006). In some recently published ethnobotanical studies, however, some factors limited or prevented the collection of voucher specimens (Díaz-Reviriego et al. 2016; de Rus Jacquet et al. 2017). This study aimed to supplement previously gathered botanical data with robust ethnographic and ethnolinguistic data. We, therefore, employed a series of *in situ* and



Figure 3. Mopan-speaking village of San José in the Toledo District of Belize (photo by Kerry Hull).

ex situ measures to ensure accuracy in plant identifications. We conducted *in situ* field interviews in the mornings using the walk-in-the-woods technique to each consultant's farmland to make it easier for the consultants to find and identify the species with which they were most familiar. These interviews involved five components. First, we asked the consultants to list the common names of plants we encountered in all possible relevant languages with which they were familiar (English, Mopan, Q'eqchi', and Spanish). We then took high-resolution photographs of each plant from multiple angles with an identifying placard. We cross-checked the plant's vernacular name(s) with scientific names in previously published ethnobotanical sources and then cross-checked associated photos and illustrations from ethnobotanical field guides. Finally, the consultants explained each plant's medicinal uses and preparation techniques, which we recorded.

We then conducted *ex situ* interviews with each consultant (or group of consultants) in the afternoons. We used plant photographs from previously published field guides and photos from online botanical databases, in addition to the high-resolution digital photographs we had taken during the *in situ* interviews. Whitecloud and colleagues (2014:382) demonstrated the effectiveness of using high-resolution digital photographs rather than voucher specimens for identification. They found that their consultants "recognized 92–96% of photographs of plants that they had indicated and named during prior walk-in-the-woods collection trips," whereas with voucher specimens alone, "the recognition rate was significantly lower and ranged from 68–86%."

We then asked about all indigenous usages and plant names a second time to confirm *in situ* identifications (cf. de Medeiros et al. 2014:93). Using a consensus methodology, we further

confirmed plant identifications by triangulating vernacular of plants in English, Mopan, Q’eqchi’, and Spanish by comparing them to names given in published ethnobotanical field guides in one or more of these languages. Knowledge of English, Mopan and often Q’eqchi’ and Spanish creates a unique linguistic environment for the Mopan of San José. This linguistic diversity allowed for greater confidence in correlating the vernacular names of each plant with their proper scientific designations since previously published botanical and ethnobotanical field guides have the names of each plant in multiple languages (e.g., Arvigo and Balick 1993; Nations 2006). Finally, we confirmed and compared all data with multiple native-speaker consultants to ensure consistency.

For this study, we limit our discussion of species to the following examples:

1. There was consensus in the responses of at least three of our consultants concerning the vernacular names of each plant in at least two languages (in most cases, it was a clear majority of all consultants);
2. We could correlate both of those names with the same scientific name in published reference materials.
3. We could cross-check the scientific names and our field photographs with online databases for visual identification.

Results

We collected information about ethnobotanical uses and linguistic data on 259 plants, 139 of which we identified as having medicinal uses among the Mopan. We identified that the most common uses were for dermatological issues, general pain issues, and blood-related issues (Figure 4). The following discussion focuses specifically on our data related to plant use in healing and well-being among the Mopan.

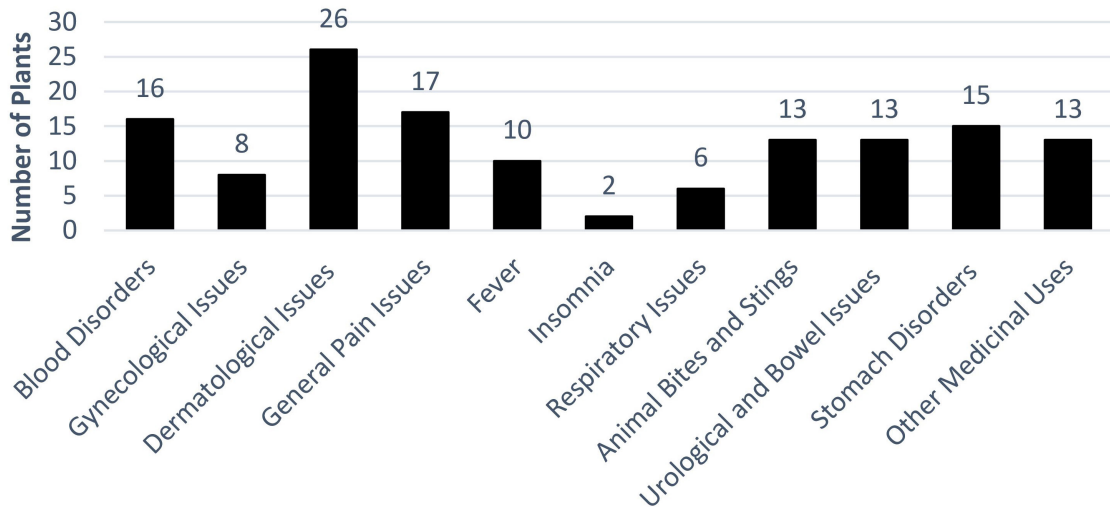


Figure 4. Quantitative data on medicinal use of 139 of plants by the Mopan Maya.

Plants, Healing, and Health in Mopan Culture: Native Notions of Wellness

Traditional use of various plants for medicinal purposes is still widespread among the Mopan Maya. However, the Mopan of Belize increasingly prefer Western pharmaceuticals. This shift in preference accompanies changes to a more market-based economy in the last half-century and more contact with other cities due to improved roads. Additionally, a more widespread influence of Christianity (see Steinberg 1997) and more easily accessible Western medicine are likely reasons. Concomitantly, traditional healers are valued less, and specific botanical remedies viewed positively in the past are often only used when pharmaceuticals become too expensive or are unavailable. For example, the white sap of a Horse balls tree (*Stemmadenia donnell-smithii*) is used for toothaches when products with benzocaine (such as Orajel) are inaccessible. Our older consultants were fully aware of this shift in attitude that has taken place over roughly the last 50 years. Despite the influence of Western medicines, in Mopan culture, many plants are recognized as affecting strength and well-being—often due to the nutritive qualities of the plants, but sometimes due to mythological or cultural conceptions.



For the Mopan, regulating the quality of blood is considered essential for health. For our purposes, we observe specific plants that are said to be “hot,” which the Mopan state are plants that “build blood”—a native concept we hope to illuminate in this study. It seems likely that the notion of “strengthening blood” or “building blood” is at least in part related to boosting red blood cell counts. Tiredness and weakness are both immediate symptoms of anemia, and many “hot” foods happen to be high in iron, but not all. In Mopan traditional thought, “hot” foods combat “weak” (i.e., “cold”) blood. In Belize as a whole, many of the indigenous remedies for increasing the “heat” of the blood include using medicinal plants in the form of “blood tonics.”

A short discussion of the concept of blood in Mopan thought is necessary to unpack the notion of well-being for the Mopan. The Mopan view blood (*k'ik'*) as a conveyer of energy and stamina, yet capable of being altered and influenced in foreign ways to Western understanding. Blood is conceived as being “hot” or “cold”, neither of which refers to thermic qualities but rather to conceptions of “strength” or “weakness” in most cases (Lipp 2010:109–110; Lopez Austin 1975; Vogt 1976:88). This “hot”/“cold” dichotomy is pervasive throughout Mesoamerica (Chevalier et al. 2003; Kunow 2003:63–64; Metz 2006:139). Food and drink are likewise imbued with notions of “heat” or “cold” related to their ability to fortify and strengthen. Among the Mopan, proper health is maintained through conscious regulation of “hot” and “cold” consumption. For example, menstruating women avoid “cold” foods since they are already cold from blood loss.

According to Fink (1987:403), “blood” among the Mopan “is the mediator of heat and cold and properly speaking it is the blood which is ‘hot’ or ‘cold’ and not the individual. A person may feel hot but be diagnosed as having a ‘cold’ blood illness or vice versa, i.e., feel cold but have a ‘hot’ blood condition.” These treatments for “weak blood” derive in part from cosmological precedents in Mopan mythology. For the Mopan, “it is therefore consistent that the properties of hotness and coldness when applied to food do indicate to the Maya a measure of nutritional value. ‘Hot’ foods are said to ‘make the blood strong,’ ‘cold’ foods ‘fill the belly’ but leave a person weak” (Fink 1987:404). Thus, “building blood” consists of properly aligning one’s consumption with cultural conceptions through the careful observance of the specific “hot” and “cold” characteristics of each

substance ingested.

Determining the health of an individual relative to their proper modulation of hot and cold often requires the expertise of a traditional healer, known as *aj-ilmaj* in Mopan from the verb *ilmaj* “to cure.” The root *-il* means “to see” or “to perceive.” Mopan healers are aptly named since they are said to *perceive* imbalances in a patient’s blood through specific acts of divination. Similarly, among the Tzotzil Maya of Chiapas, Mexico, healers are also called *j’ ilol*, literally “the one who sees,” because they are “the only people to whom clever souls are attributed” (Groark 2010:104).

According to Fink (1987:405), healers know how to “diagnose illness by ‘reading the blood’ and how to cure by prescribing the correct herbal remedies to their patients.” A hot/cold imbalance affecting a person could also be diagnosed as originating from sorcery. Healers, or “bush doctors” as they are most commonly referred to in Belizean English, are, in many cases, sorcerers themselves (also called *pulya’aj*). They can detect the presence of a curse on the patient and prescribe the appropriate type of plant, food, or drink to counteract the curse based on the “readings” they take from the patient’s blood.

Discussion

The Mopan typically view psychiatric disorders as cold imbalances (cf. Wilson 1999:135) and are treated through natural botanical remedies. The Mopan talk about several neurological and mental disorders: madness, epilepsy, depression, anxiety, stress, and *susto* (a kind of “fright” that weakens a person’s ability to fight illness; cf. Bourbonnas-Spear et al. [2005:328] for similar disorders among the Q’eqchi’ Maya).

The Mopan use (*aj*)-*paay pokche’*, or skunk root (*Chiococca alba* [L.] Hitchc.), to treat mental anxiety or headaches. The leaves of this foul-smelling shrub are boiled, and the patient drinks the resulting tonic. This plant is also used for cramps and rheumatism by heating the leaves on a griddle and applying them to the skin.

When people have *wax upol*, i.e., high blood pressure, they are said to become idle and lethargic while simultaneously having a “crazy” look in their eyes. A plant, known as (*aj*)-*so’sol pim*, is said to cure “craziness” (e.g., if someone goes around madly telling wild stories, or walks around naked). The afflicted person is bathed in a mixture of leaves and water three times a day for two days.

The (*ix*)-*k’an-te’*, gliricidia or madre cacao (*Gliricidia sepium*), is used to treat depression and sadness. Madre cacao is also used medicinally to bring down fevers by bathing the patient in water with its leaves.

Women who suffer from a fright (*susto*) when they are pregnant or during menstruation make a tonic from the leaves of the *xaab’ mama’*, a scientifically unidentified plant. A *susto* refers to being frightened to the point where one’s spirit becomes “weakened” and highly susceptible to illness. In the village of Chan Kom in Yucatan, Mexico, Redfield and Villa Rojas (1934:161–162) note that the people say “any weakness, anemia, loss of appetite or low physical condition, especially in a woman,” is attributable to *pasmo*, which, according to Kunow (2003:65), is “the result of a fright or shock.” Similarly, among the Q’eqchi’ Maya, a *susto* or a hot/cold imbalance results in an “irregular, erratic pulse” (Gezelle 2014:20).

Pasmo, a Spanish term used to describe an imbalance in one’s “heat” or “cold” (though usually an overabundance of “cold”; cf. Wilson 1999:134), is treated with the leaves of the (*ya’ax*)-*k’omo’che’*. The Mopan say that if you feel weak, you should take the leaves of the (*ya’ax*)-*k’omo’che’*, boil them,

and drink the mixture after it cools. They say this will “give you energy” and “build your blood.”

The Mopan also rely on the amaranth (*Amaranthus*) to “strengthen the blood.” In Mopan, it is commonly known as *ix-kalalu*, which derives from the Kriol name *Callaloo*, with the feminine prefix *ix-*. Its proper Mopan name is *ch’ayu’uk’*. Medicinally, they say that amaranth not only strengthens the blood but also makes one “feel strength in the bones.” Among the Garifuna population of Belize, amaranth is used also used to “build up blood” (Santos n.d.:17).

The balsam pear or bitter melon (*Momordica charantia*) (*[ix]-jamoor/yamor/yamol* in Mopan) is renowned throughout Belize and is valued for its various medicinal qualities. When using it to “build the blood” of an individual, the Mopan boil its leaves to produce an ingested tonic. Grover and Yadav (2004) note that the medicinal qualities of *Momordica charantia* have been repeatedly demonstrated through scientific methods in recent years. Studies have shown that the plant aids in treating diabetes, various types of cancer, and fevers and can be used as an antibacterial, anthelmintic, abortifacient, and antiviral agent. The Mopan, however, most value its ability to “build the blood” and purify blood when drunk daily as a tonic. Arvigo and Balick (1993:195–196) have also noted Belizean usages of the bitter melon as a “fine blood and organ cleanser.” Baines (2012:228) also notes, “I heard the use of *yamor* discussed as a sort of cleaning ritual, it forming a kind of tonic that the ‘old people’ used to drink every so often to clean the blood.” Arnason et al. (1980:353) list a number of plants (e.g., *Parthenium hysteropohus* L., *Croton Schiedeanus* Schlecht, *Capraria biflora* L., *Cassia grandis* L.) that are said “to build blood,” one of which is the *Momordica charantia*.

The Mopan also value several trees for their ability to “build blood.” The semi-deciduous large legume *b’uk’ut* tree, or stinking toe (*Cassia grandis*), is favored to strengthen the body. The long, wood-like capsules grow to 20–40 cm long and contain upwards of 40 seeds per pod. Mopan men and children suck on the seeds to “build blood” or give them “more blood,” i.e., increase their strength and stamina. Atran (1993:655) reports the Itzaj Maya, linguistic relatives of the Mopan, also eat Stinking toe (*b’ukut’*) in order to “strengthen the blood” (*muk’ uk’ik’eI*). Similarly, among the Garifuna of Belize stinking toe is said be a “blood builder” (Arzu and Thiagarajan 2016:17). Stinking toe seeds are known to be high in iron (Earle and Sánchez Vindas 2001:67), which would help to explain its use against anemia and its strength-building qualities since it would increase red blood cell counts. Harmon (2004:107) likewise notes the medicinal properties of *Cassia grandis* “to help fight anemia by adding iron to the blood.” High iron content is one of the reasons why the commercially sold drink *Carao*, derived from stinking toe, is becoming popular as an iron supplement today.

Endemic to Central America and northern South America, the provision tree, or *wakuut* in Mopan (*Pachira aquatica*), is also noted for its ability to “build blood.” The Mopan peel the bark of the provision tree and boil it to produce a tonic that is drunk two to three times a day for several weeks. They say this “gives you blood” and strength. The Q’eqchi’ Maya of Belize, who have precisely the same tradition, say that a tea from the provision bark tree should be drunk by pregnant women so that they will “have enough blood” (Gezelle 2014:50).

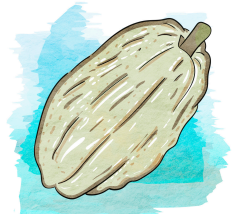
The (*aj*)-*päjpäjchína*, or bitter orange (*Citrus aurantium*), is said to be a cure for “sweet blood,” by which the Mopan mean a type of diabetes or low blood sugar. They associate diabetes with a general weakening of the blood and, therefore, weakening the body. Drinking the juice of

the bitter orange is said to make one's blood "stronger." The Yukatek Maya have a similar tradition. *Bilis*, meaning a condition brought about by strong emotions like anger, is treated by Yukatek Maya healers with this orange juice since anger is a "hot" emotion (Kunow 2003:64).

Another cure for "sweet blood" is the *k'uche'* (literally "god tree") or cedar (*Cedrela odorata*), a tree whose name enjoys a wide distribution among Mayan languages today and is even attested in the Maya hieroglyphic script on Lintel 10 at Yaxchilán. It can be boiled as a tonic to combat "sweet blood," i.e., a tired or weak feeling. The notion of "sweet" relating to the "hot"/"cold" dichotomy has also been noted in other Mesoamerican cultures (Aparicio Mena and Di Ludovico 2013:30). The Mopan Maya also use the bark of the cedar medicinally for kidney stones by boiling the bark with half a cup of sweet oil and drinking it as a tonic. It can also be mixed with the *ya'ax-che'* plant to fight kidney stones.

Conclusion

Forest botanicals play a significant role in the daily lives of the Mopan Maya of San José, Belize. Nearly all households participate in farmland agriculture and gardening. Additionally, the forest provides a wealth of medicines that the Maya have likely used for millennia. For example, epigraphic evidence from the Classic Period together with ethnographic data from the Q'eqchi' Maya suggest the possible medicinal use of *T. guatemalensis* (Ferrier et al. 2020). The Mopan view various food and botanical resources as having inherent "hot" or "cold" qualities that accompany similar beliefs about the human body's blood. In Mopan traditional healing, knowledge of "hot" and "cold" properties allows one to respond to numerous illnesses by counteracting perceived imbalances by "building" one's blood through certain plants and consumables. The proper regulation of one's blood in this "hot"/"cold" dichotomy ensures good health, and "building" one's blood addresses poor health. We have shown in this study the continuing presence of this tradition even within a changing economy and social structure. Despite a growing tendency to rely on Western pharmaceuticals, the Mopan still look to the forest for medicine and traditional means of healing.



Acknowledgments

We would like to thank Terry Ball, M. D. Turner, Meaghan Peuramaki-Brown, and several anonymous reviewers for their helpful comments and critiques of earlier versions of this study. All remaining errors are our own. We would like to thank Reitaku University and Brigham Young University for generously funding the field research that provided the data used in this study. We are especially grateful to our friends in Belize, consultants who worked closely with us over the years in the collection and analysis of the data presented here, especially the community in San José, Belize. Additionally, we note here that following Informed Consent and Research Participation (IRB) guidelines, we asked all consultants to fill out an IRB consent form prior to involvement in our project.

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