Ancestral Remembrance and Food Consumption at La Chiripa in Ancient Arenal, Costa Rica

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Abstract

Archaeological studies in the Arenal Region of Costa Rica have long demonstrated the role of social memory in ancient life, helping to maintain a resilient lifestyle within this volcanically active setting. This has included studies of ritual processions along pathways connecting settlements, natural springs, and cemeteries as well as research into the reoccupation of villages after forced abandonment due to periodic volcanic eruptions. Recent paleoethnobotanical investigations have revealed that consumption also played a key role in social activities that honoured the ancestors of Arenal. Preserved plant materials recovered from a firepit that was ignited after the abandonment of the La Chiripa house structure (1500 cal BCE) reveal an extensive remembrance ceremony and feast. This paper investigates the use of food, alcohol, and perhaps even psychoactive substances to perpetuate the social memory of generations of ancestors that previously occupied the domestic space.

Introduction

Archaeological studies in the Arenal Region of Costa Rica have long demonstrated the role of social memory in the lives of past people within this volcanically active setting. Pre-Hispanic residents perpetuated the memory of their ancestors through ritual processions along pathways connecting settlements, natural springs, and cemeteries, beginning around 500 BCE (Sheets 2009, 2011; Sheets and Sever 2006: 162). Past people of this region felt such a strong connection to this area that, even after villagers were forced to abandon their homes due to periodic eruptions of Arenal volcano, populations returned to the exact same settings. This return appears to occur as soon as the recovery of the landscape was sufficient enough to rebuild settlements—as has been seen at both the

Cañales and Sitio Bolivar village sites (Sheets 2009, 2011; Slotten 2024). Recent paleoethnobotanical investigations at the site G-995 La Chiripa have revealed that firepit installations that incorporated food and beverage consumption also played a key role in social activities that honoured the ancestors. The burning of over 70 plant taxa in a hearth located within an abandoned dwelling indicates a possible ceremony, incorporating the use of an elaborate assortment of food, alcohol, and perhaps psychoactive substances. This paper suggests this served to perpetuate the social memory of the ancestors that occupied the space centuries before. Consumption practices, in various forms, were intertwined with the social activities of these people, as they likely performed a remembrance ceremony for their ancestors who once lived in this space.

Site Description

La Chiripa (G-995) is located on a ridgetop along the continental divide roughly 4km south of present-day Lake Arenal, Costa Rica (Fig. 1). A Tronadora phase (2000–500 BCE) structure was discovered at this site beneath a processional footpath, resulting in the documentation of one of the oldest known domestic structures in the country, dating to approximately 1500 cal BCE (Vázquez and Sheets 2024, see Table 2 and Fig. 2 for calibrated dates). Tronadora Vieja (G-163) is the only other known site in Costa Rica with structures dating to this time period (1800 BCE), located just north of La Chiripa (Fig. 1), along the shore of the modern-day Lake Arenal (Bradley 1994; Hoopes 1987, 1994). This village had multiple residential structures that were circular in plan with a range in diameter of 5 to 8m (Sheets 1994: 319–320). Their post holes were large and evenly spaced, suggesting that the structures were semi-permanent rather than temporary (Sheets 2011).

All that remained of La Chiripa's dwelling's architecture were 19 similarly spaced postholes, two of which indicate an entryway that faced towards the south, topped by an awning (Feature 3). This formed a circular structure measuring roughly 4.2m in diameter (Fig. 3) (Vázquez and Sheets 2024: 86). The only ceramic sherd recovered from the stratum of the La Chiripa structure (Un.61) was intrusive, found within the fill of a post hole, thus it cannot be used to discuss food serving or consumption in this household. Excavations revealed numerous boiling stone fragments distributed throughout the house floor, in addition to a firepit feature located within the structure on the eastern side (Feature 2). The firepit was filled with a darker soil than the structural floor and included a gradient of 13 boiling stones, with larger stones at the bottom and smaller fragments

located towards the top. Additionally, the feature contained two percussion flakes made from quartzite and dacite (Sheets 2024b). Hearths in the Arenal region tend to be exterior to homes in all time periods (Bradley 1994a, 1994b; Hoopes and Chenault 1994). The fire installation feature at La Chiripa was placed within the structure, however, the firepit dates to approximately 1250 cal BCE whereas the house floor shows an occupation around 1500 cal BCE (see Table 2 and f. 2). Additionally, the firepit was ignited at a time that roughly coincided with the abandonment of the structure. This correlation is based on the radiocarbon dates obtained from samples of organic material and sediment that filled in the voids left by wooden posts when they were either removed or decayed post-abandonment. The probability distribution of the calibrated dates from the abandonment of the structure (above-mentioned samples) and the firepit feature indicates that these are roughly contemporary (Fig. 2), which suggests that the fire installation was a form of perpetuating the social memory of this space and the ancestors who resided here in the past. No thatch or structural elements were preserved and there is no indication that the fire burning event or a volcanic eruption led to the direct destruction of the dwelling. If the former occupants of the structure used a hearth to cook their food, it must have been located farther away and was not detected within the limited space of this excavation, which only minimally uncovered exterior spaces of the residence due to time constraints.

It is unlikely that this specific structure was continually occupied for the duration of several centuries between the initial occupation and the fire installation event, due to multiple major eruptions of Arenal volcano in the interim (AT-9 circa 1456 BCE and AT-10 circa 1276 BCE, see Egan 2019, Table 4.4). These eruptions would have led to the temporary displacement of the Arenal region's residents until the vegetation and landscape had recovered, a process that could have taken decades or perhaps centuries.

The firepit could be the remnants of an event where people paid tribute to and thought back to a time when their ancestors lived in this space. The presence of the firepit and its contents suggest that a parting ceremony took place when the house was abandoned and that the Arenal residents feasted to commemorate their ancestors as well as the longevity of this place they called home. Ceremonies performed decades or centuries after the cessation of activities within this building could represent a collective memory built upon this space (Dussol et al. 2019: 12). Fires and hearths have played a central role in termination rituals, as has been documented archaeologically elsewhere in the Americas (e.g. Clayton et al. 2005; Dussol et al. 2019; Guderjan 2004; Pagliaro et al. 2003; Stanton et al. 2008).

Methodology

A systematic collection of 5L bulk soil samples designated for flotation from every 0.5m^2 of the structural floor allowed for 98 sediment samples (372.5L). Of these samples, 15 (91L) were collected from the firepit feature, which had a depth of 15cm (Sheets 2024a: 104). Excavation of this firepit did not reveal distinct segments of use, so soil samples were collected through arbitrary levels of approximately 3–4cm in depth each. The samples were processed using a Siraf-style flotation machine that used pressurized water flow to separate organic material embedded in the sediment matrix. A fine mesh cloth (0.2mm opening) collected both the light and heavy fractions; both fractions were sorted and analysed in the search of preserved plant material under a stereomicroscope (7X–45X). For identification purposes, wood charcoal fragments larger than 2mm were fractured into transverse, tangential, and radial sections and imaged using a TM-1000 Scanning Electron Microscope at the Archaeological Research Facility at the University of California, Berkeley. Taxonomic identifications were supported by comparative material in the reference collection of plants from Central and South America in the McCown Archaeobotany Laboratory, as well as the InsideWood Database, North Carolina State University (Wheeler 2011; Wheeler et al. 1989). Species level identification was only reached if reference material was available for all possible species within the country and these species were distinguishable anatomically.

Food Plants Recovered from the Hearth

A total of 72 botanical taxa were identified from the 532 preserved plant remain fragments recovered from the hearth feature involved in the abandonment and remembrance ceremony at La Chiripa (Table 1). This included 66 woody taxa presumably burned as a fuel and 39 plants that produce edible parts. The high diversity of taxa within this hearth depicts the people's broad spectrum of engagement with their forested landscape. This subset of edible plants comprises many commonly consumed foodstuffs from the Americas, such as the cultivars maize and common beans (Fig. 4) as well as parenchymatous tissue from manioc. The primary artifacts associated with the firepit or even the former dwelling were fire-cracked rocks or boiling stones, suggesting that the main form of food preparation would have been the boiling of foodstuffs into a soup or gruel. The lack of ceramics associated with these features indicates that this preparation potentially used a perishable material such as basketry. Flavourings that may

have been added to a meal, such as the spicy floral parts of *Acmella*, were also quite prevalent within the hearth feature. Additionally, wood from many well-known trees and shrubs that produce edible fruits and seeds were identified, such as achiote, cacao, cashew, cherry, guava, hackberry, mamey, and nance, among others (Fig. 5). Such an assortment of foods suggests that this remembrance ceremony incorporated feasting activities in the space where the structure once stood. The most prevalent plant taxa found within the hearth are displayed within Figure 6.

Even though both maize and beans were cooked within this fire pit, they would not have been especially productive crops within this Premontane Wet Forest lifezone, because it experiences an excessive amount of precipitation (Tosi 1980). Koshear's (1995: 68) ethnographic study of Guaymí farmers in the Coto Brus region of Costa Rica found that maize had the highest failure rate from year to year compared to any other crop and was the only crop for which negative returns were recorded, often due to weather-related causes. More permanent crops thrive better in this area, such as an agroforestry system that incorporates the maintenance of fruit producing trees and shrubs, as is suggested was present near this site due to the abundance of fruit trees in the assemblage.

Stable carbon isotope analysis of skeletal material from multiple individuals from the later Silencio Phase (600–1300 CE) in the Arenal region revealed a range of values from -16.6 to -20.8 δ13C. This indicates that a maximum of 12 percent of the diet of these people came from C-4 photosynthetic pathway plants such as maize (Friedman and Gleason 1984; Norr 1991:179). Neither the maize nor beans were abundant at La Chiripa and were only found within the firepit, thus aligning with this isotopic data. The inclusion of these crops in the firepit signifies they were valued as more than just a source of sustenance, since this feature was not for regular food processing but rather to commemorate the space and its past occupants. Early chroniclers, documenting the Talamanca region of Costa Rica, noted how the majority of the maize produced by the people of this area was reserved for making chicha, a fermented drink (Gabb 1875). It is unfortunate that no ceramics or ground stone artifacts such as metates were located in association with the La Chiripa firepit that could be used to confirm such a form of consumption. If the elaborate metates, one of the more notable artifact types found throughout Costa Rica (Miller Graham 1992), were in fact associated with the preparation or processing of maize, then the consumption of maize within this setting was not simply utilitarian but rather had deep cultural meanings tied to its use.

Chemical residue analysis of the hearth at La Chiripa revealed high values of phosphates, carbohydrates and proteins (Barba et al. 2024). Phosphate and protein residues can usually be associated with fire-transformed animal products. Other than this chemical signature, no faunal remains were recovered at La Chiripa—at least within the limited range of excavation thus far. The carbohydrate residues are usually associated with starchy vegetables that may have been cooked, suggesting that starchy underground storage organs (USOs), also known as geophytes, were a component of subsistence strategies. A total of nine macrobotanical USO fragments were identified from within the hearth, which is substantial since this type of material rarely preserves archaeologically and is more typically identified in the microbotanical form of starch grains. USOs are one of the most frequently consumed carbohydrates in the human diet and are also an important source of energy and sugars (Kubiak-Martens 2016). The preservation of archaeological USOs and fruits that would have been eaten fresh is rare; they contain a high amount of water and oil and are less likely to be exposed to fire in a way that could lead to carbonization (Hather 2000). Rather, roots are typically prepared through boiling, and fruits may be consumed without being cooked at all. Although the USOs within the macrobotanical assemblage in the hearth at La Chiripa are nearly identical in terms of quantity and ubiquity to maize, it likely formed a larger portion of the diet than initially observed. This takes into consideration how USOs are less likely to survive in the record, in comparison to the much more durable maize cob fragments. The Guaymí only harvest their root crops when they are needed, since they keep better in the ground, stored alive and continually growing (Koshear 1995: 83). For the past residents of Arenal, root crops would still be available underground after an environmental disaster such as a volcanic eruption, making them a more reliable food source than maize in such a setting.

Fragments of both parenchymatous tissue and wood charcoal were identified to be manioc, suggesting that the plant was growing in the vicinity of the structure. Manioc is a small tropical tree or bush that produces carbohydrate-rich roots and is a significant crop in traditional swidden cultivation systems today in the Neotropics (Piperno 2006; Sheets et al. 2011). Manioc grows well in a wider range of soils compared to maize and produces a considerably greater harvest in terms of both weight and calories per unit area (Sheets et al. 2011). Starch grains from Panamanian archaeological sites show that the root crop was in the region by 5000 BCE, along with arrowroot (*Maranta arundinaceae*) and yams (*Dioscorea trifida*) (Dickau 2005, 2010; Dickau, Ranere, and Cooke

2007). Microbotanical analysis has identified manioc, along with sweet potato, lerén (*Calathea allouia*), and arrowroot, from Formative period settlements (1600–900 BCE) in northwestern Honduras through (Morell-Hart, Joyce, and Henderson 2014). This documents a similar significance of underground storage tissues in the diet of Isthmo-Colombian peoples roughly contemporary to the La Chiripa settlement. Elsewhere in Costa Rica, evidence for the use of root crops such as lerén, sweet potato, and yam alongside maize and beans is also evident, demonstrating the widespread practice of incorporating both into subsistence regimes in the past (Azofeifa López 2023; Hoopes and Bozarth 2012; López-Rojas et al. 2024; Stone 1977).

Other Forms of Consumption

Fermented beverages and possibly other mind-altering plants were likely consumed as part of this abandonment ceremony. Incorporation of such plants into feasting practices to transform the consciousness of participants has been previously investigated in studies of other countries (Dietler 2001:73). Intoxicants have a long history of enhancing cognition, providing stimulation, enabling sociability, and aiding in physical activities (Rafferty 2021:10).

Plants identified from this hearth that could have been used to produce fermented drinks include cacao, coyol, manioc, nance, and maize (Ambrocio-Ríos et al. 2021; Joyce and Henderson 2007; McGovern 2017; Medina-Torres et al. 2004; Rodriguez and Arce Cedras 2019). Evidence of cacao beverages elsewhere in Mesoamerica (Ulúa Valley in Honduras, Soconusco region along the Pacific coast of Guatemala, and the Gulf coast area of Mexico) also date to around 1500 BCE, where it has been argued that the pulp of the cacao fruit was initially consumed as a fermented beverage (Henderson and Hudson 2019; Henderson and Joyce 2007). Interestingly, other species present in the hearth have been documented as additives in cacao beverages throughout Central America. Maize may have been combined with cacao to create a beverage, such as 'tejate', as was practiced farther north in Mesoamerica by later Maya, Aztec, and various other groups in Oaxaca (Sotelo et al. 2012). Additionally, Zapotec, Aztec, and Maya populations have added aromatic flowers to cacao beverages since pre-Hispanic times, including the flowers from the 'flor de cacao' (*Quararibea*) tree and the white 'popcorn' flower (*Bourreria*). This has been said to both strengthen the flavour and add a pleasant fragrance to the drink (McNeil 2012). Furthermore, achiote seeds may have been added to cacao beverages to add red colouring and a spicy flavour. Due to the strong presence of cacao in the wood

charcoal remains, in conjunction with other plants known to have been added to the chocolate beverages in pre-Hispanic times, it is quite possible that the villagers at La Chiripa were consuming cacao in a similar manner during their remembrance ceremony.

A hallucinogenic snuff made from ucuhuba (*Virola surinamensis*) may have also been involved, prepared from the reddish inner bark resin of this tree by groups (Plotkin and Schultes 1990). Two tobacco seeds were recovered from the edge of the hearth. The first documented evidence for the use of tobacco in Costa Rica comes from comments by Gonzalo Fernández de Oviedo during the 16th century, when he was presented with rolls of tobacco by a cacique during a ceremony. Notably, this ceremony also incorporated the consumption of fermented beverages such as maize and cacao (Fernández de Oviedo 1851: 96). Gabb (1875) also documents the use of tobacco, along with chicha and cacao, in ceremonial activities of the extant Bribri and Cabecar indigenous groups. The tobacco from potentially either the *Nicotiana tabacum* or wild *Nicotiana rustica*, would have been consumed both orally and nasally, and provided a powerful effect (Carmody et al. 2017; Rodriguez and Arce Cedras 2019).

When combined, this assortment of plants associated with particular social meanings indicate that this burning act was perhaps within a ceremonial setting. The consumption of mind-altering plants and fermented beverages in ancient Costa Rica was linked to shamanistic healing practices, social-ceremonial events, and ritual activities (Rodriguez and Arce Cerdas 2019). Since the fire was ignited simultaneously with the end of this house structure's life, the mind-altering practices that may have taken place could have incorporated intentions to honour and remember the ancestors that occupied this space previously. While artifacts related to such practices were not recovered from the site, the surviving botanical remains suggest that such social activities could have occurred in this space. Further investigations of residues preserved on Tronadora period ceramics collected elsewhere in the region could provide further insight into this matter.

Conclusions

At the end of the La Chiripa structure's life cycle, residents of Arenal performed a ceremony that incorporated the consumption, burning, and ultimately the deposition of over 70 plant taxa in order to commemorate this domestic space and its potential significance to generations of inhabitants. This expansive assortment of plants recovered from the hearth at La Chiripa suggests that feasting and perhaps mind-altering practices occurred as part of the performance

of a ceremony that took place when this domestic structure was ultimately abandoned. Were the inhabitants of this structure shamanic or religious practitioners, like the inhabitants of Casita de Piedra in Panama circa 4000 BP (Dickau, Redwood, and Cooke 2013)? Or were they ordinary members of their communities whose social practices involved the use of intoxicants? Was this fire burning event performed by the former inhabitants of this structure or at least by people who had maintained a connection to its descendent inhabitants? What is certain and most notable from these findings is that the use of this space cannot be so narrowly defined to the simple consumption of food. The timing of this fire installation or ash deposit coincides with the desertion of the structure and incorporated an extensive assemblage of plant materials. The collective memory of this space and its inhabitants led to the intentional effort to bring together an extensive array of plants to burn and perhaps consume communally as a part of a feast. The wide assortment of preserved plant remains demonstrate the interplay between food practices, social identity, and perhaps the ritual realm, in the commemorative celebrations or remembrances at La Chiripa.

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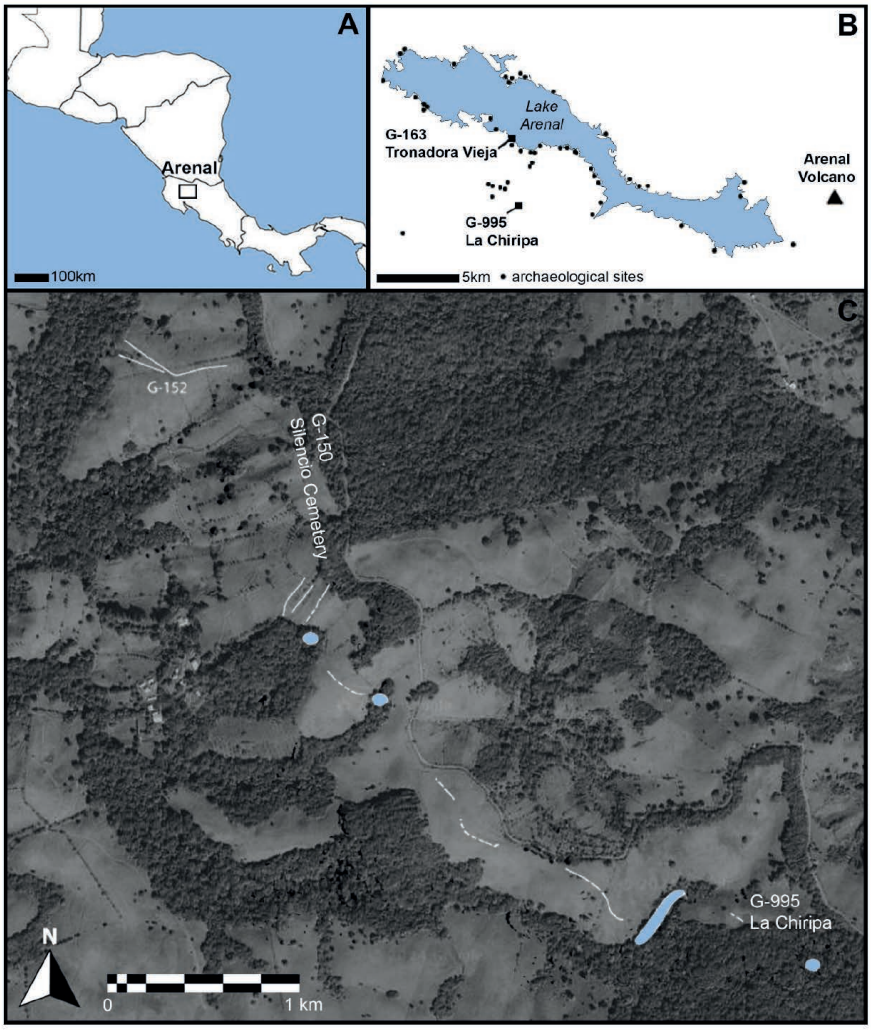


Figure 1: A) Arenal's location within Central America. B) G-995 La Chiripa's location within the Arenal Region. C) Map of G-995 La Chiripa, the related footpaths (white lines), springs (blue features), and the nearby site of G-150 El Silencio cemetery.

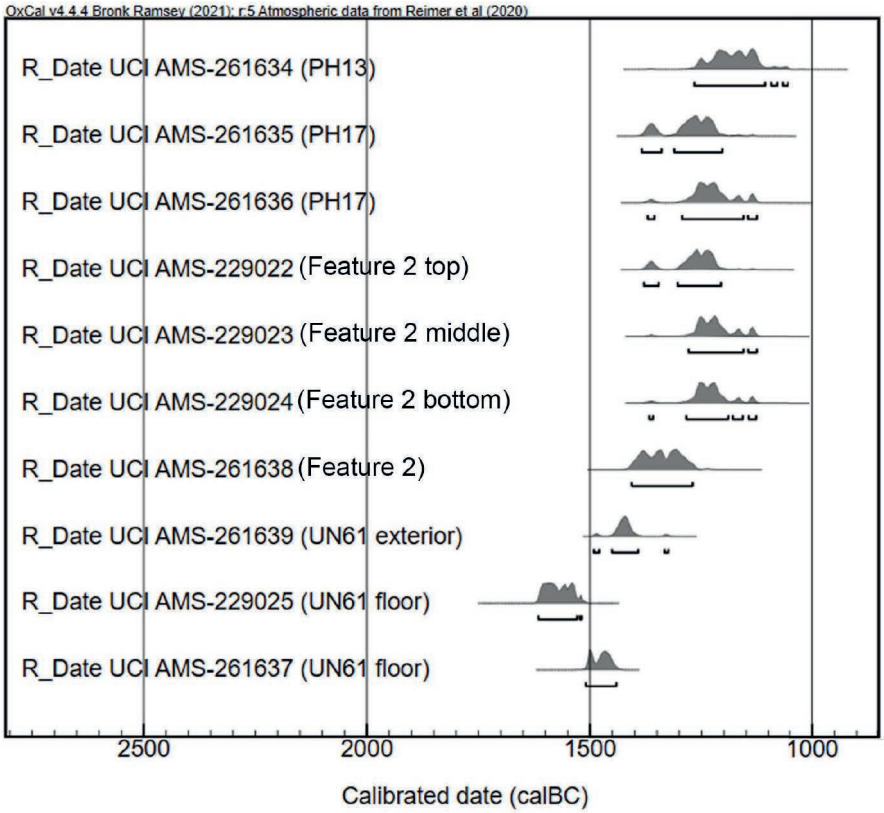


Figure 2: The calculated probability distributions for each dated sample from G-995 La Chiripa Un. 61 and the fire installation (Feature 2), shown with their 2-sigma standard deviation and median intercept.



Figure 3: View of the horizontal excavation of the La Chiripa structure with the sectioned hearth feature in the upper centre of image. The posthole pairs to the right of the photo, indicate an entryway to the structure facing towards the south (Vázquez and Sheets 2024: Fig. 12).

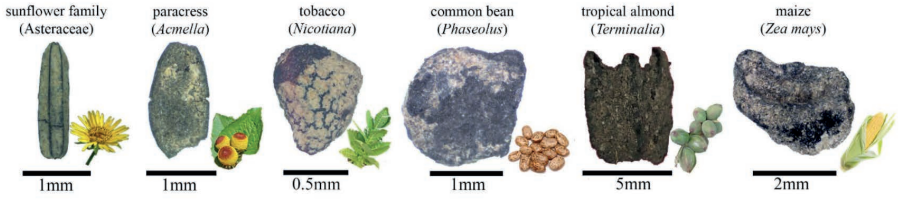


Figure 4: Edible taxa recovered in the form of seeds, fruits, and achenes from the hearth feature at La Chiripa.

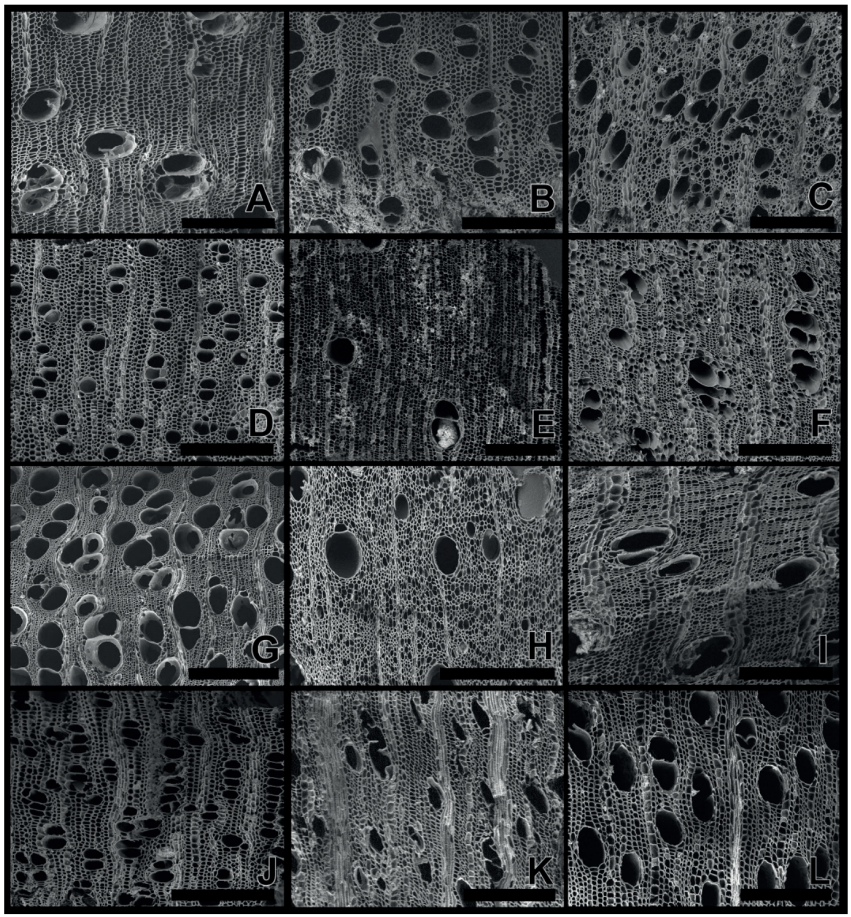


Figure 5: A selection of arboreal taxa recovered from the hearth at La Chiripa. All images are of the transverse view and scale bars are 300µm. **A** *Anacardium* (cashew), **B** *Bixa* (achiote), **C** *Annona* (cherimoya), **D** *Byrsonima* (nance), **E** *Manihot* (manioc), **F** *Pouteria* (mamey), **G** *Prunus* (cherry or plum), **H** *Psidium* (guava), **I** *Quararibea* (molenillo), **J** *Tabernaemontana* (milkwood), **K** *Theobroma* (cacao), **L** *Spondias* (jocote).

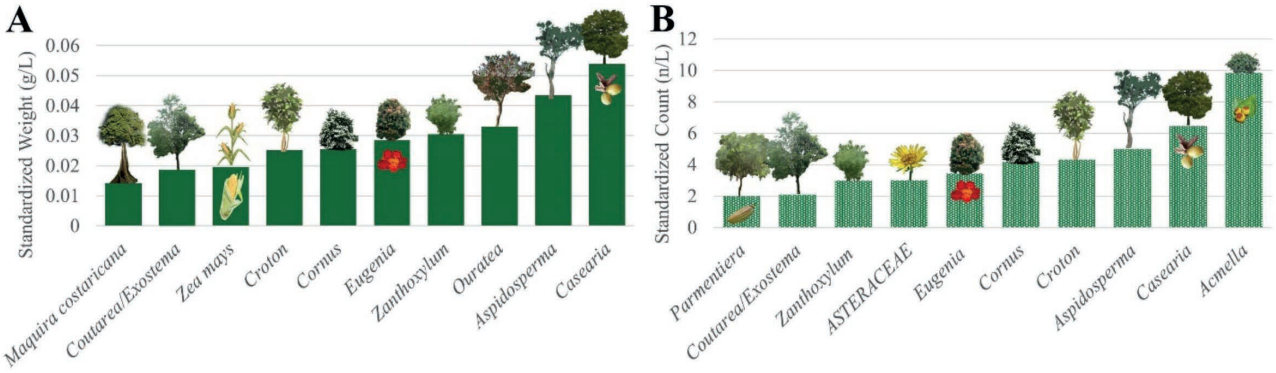


Figure 6: The most common plant taxa recovered from the hearth feature at La Chiripa in terms of **A)** weight and **B)** count of the total 91L sampled. If the plant produces an edible part, it is pictured within its bar.

Table 1: Plant taxa recovered and identified from the hearth feature at G-995 La Chiripa: 91L of sediment samples processed through flotation. Plant parts recovered: [1]achenes, [2]seeds, [3]cupules, [4]wood charcoal, [5]geophyte fragments.

Herbs	**Common Name**	**Count**	**Weight (g)**
Acmella sp.[1]	paracress	53	0.0080
Asteraceae [1]	sunflower family	39	0.0010
Poaceae [2]	grass family	11	0.0007
Cultivars			
Manihot sp. [5]	yuca, manioc	4	0.0310
Phaseolus sp.[2]	commo bean, frijol	1	0.0250
Zea mays[3]	maize	9	0.1260
unidentified geophytes[5]		7	0.0760
Palms			
Arecaceae[4]	palm	5	0.0250
Fruit Shrubs			
Ardisia sp. [4]	coralberry	1	0.0110
Bixa orellana	achiote	4	0.0560
Byrsonima sp. [4]	nance	2	0.0120
Celtis sp. [4]	hackberry	3	0.0210
Gaultheria sp. [4]	uvita, mortiño	6	0.0460
Miconia sp. [4]	canillo, papelillo	4	0.0330
Muntingia calabura[4]	capulin, jamaican cherry	2	0.0100
Other Shrubs			
Calliandra sp. [4]	gallito	2	0.0290
Capparis sp. [4]	garrotillo	2	0.0620
cf. *Neea* sp. [4]	canela, canelito	1	0.0050
Sebastiania sp. [4]	milkwood	1	0.0080
Fruit Trees			
Anacardium excelsum [4]	wild cashew, espave	1	0.0240
Annonaceae [4]	soursop, guanabana	1	0.0030
Bourreria sp. [4]	canalú	6	0.0730
Campnosperma panamense [4]	orey	1	0.0130
Casearia sp. [4]	corta lengua, mauro	36	0.3550
Cheiloclinium cognatum [4]	fruta de mono, cocora	1	0.0030
Clidemia sp. [4]	soapbush, canillo	8	0.0860

Coccoloba sp. [4]	uvito, sea grape, uvero	2	0.012
Crateva sp. [4]	guaco, perguetano	3	0.0500
Eugenia sp. [4]	pitanga, escobillo blanco	15	0.1190
Naucleopsis sp. [4]	palo de pico	2	0.0090
Ouratea sp. [4]	ouratea	7	0.1210
Parmentiera sp. [4]	arbol de vela	10	0.0440
Pouteria sp. [4]	mamey, nisperillo	5	0.0380
Prunus sp. [4]	cherry, plum	1	0.0130
Psidium sp. [4]	guava, guayaba	8	0.0730
Quararibea sp. [4]	guayabillo	1	0.0140
Tabernaemontana sp. [4]	milkwood	6	0.0610
Terminalia sp. [2,4]	tropical almond, guayabillo	9	0.1290
Theobroma sp. [4]	cacao	2	0.0100
Other Trees			
Acacia sp. [4]	acacia	2	0.0100
Alchornea sp. [4]	achiotillo	3	0.0130
Aspidosperma cf. *megalocarpon*[4]	aracanga, alcarreto	27	0.2190
Buchenavia sp. [4]	amarillo, amarillo de pepita	4	0.0300
Calycophyllum candidissimum [4]	madroño, alazano, degame	5	0.2760
Cedrela sp. [4]	cedro	3	0.0150
Cornus cf. *peruviana* [4]	lloró, dogwood	27	0.2580
Coussarea sp. [4]	huesito	2	0.0420
Coutarea/Exostema [4]	azulejo, quina	8	0.0780
Croton sp. [4]	sangrillo	16	0.0910
Dalbergia sp. [4]	rosewood, cocobolo	1	0.0090
Dendropanax sp. [4]	vaquero	1	0.1444
Enterolobium schomburgkii [4]	timbauba	3	0.0330
Faramea sp. [4]	huesito, benjamín, garrotillo	3	0.0360
Hasseltia sp. [4]	parimontón, raspa lengua	2	0.0350
Hirtella sp. [4]	camaron, garrapato, conejo	1	0.0150
Hura crepitans [4]	nuno, havillo, ceibo	16	0.1710
Jacaranda cf. *caucana* [4]	blue flamboyant jacaranda	3	0.0600
Magnolia sp. [4]	candelilla, baco	8	0.0600
Maquira costaricana [4]	palo de pico	2	0.0850
Margaritaria nobilis [4]	clavito	1	0.0030
Maytenus sp. [4]	mayten	5	0.0120
cf. *Myroxylon balsamum* [4]	bálsamo, sándalo	2	0.0400
Peltogyne sp. [4]	amaranto, el nazareno	3	0.0230
Platymiscium sp. [4]	granadillo, quira	4	0.0270
Schefflera sp. [4]	mangabé	4	0.0390

Sloanea sp. [4]	carabeen, terciopelo	7	0.0660
Swietenia spp.	caoba, mahogany	4	0.0380
Trema sp. [4]	jordancillo, capulin	2	0.0940
Trichilia cf. *pleeana* [4]	conejo colorado, fosforito	1	0.2020
Virola sp. [4]	baboonwood, ucuhuba	1	0.0060
Zanthoxylum sp. [4]	arcabú, tachuelo, pricklyash	21	0.2220

Table 2: G-995 La Chiripa AMS radiocarbon dates relating to the Tronadora phase structure. All dates are calibrated in OxCal 4.4.4 using the IntCal 20 atmospheric curve (Bronk Ramsey 2021, Reimer et al. 2020). Fruits, seeds, and geophytes prioritized due to their restricted ranges of growth years. Any wood charcoal used was intentionally chosen because of its anatomical characteristics indicating it was younger in its growth.

Laboratory Code	Level	Context	Radio-carbon Age (BP)	2δ calibrated range	Source Material
UCI AMS-261634	Un 61	Post Hole 13	2965±25	1266-1108 BCE (92.7%) 1094-1081 BCE (1.5%) 1068-1056 BCE (1.3%)	Achenes (*Acmella* sp.)
UCI AMS-261635	Un 61	Post Hole 17	3020±20	1384-1340 BCE (18.9%) 1312-1204 BCE (76.5%)	Wood charcoal (*Casearia* sp.)
UCI AMS-261636	Un 61	Post Hole 17	2995±20	1371-1356 BCE (2.7%) 1294-1156 BCE (85.6%) 1146-1126 BCE (7.1%)	Achenes (*Acmella* sp.)
UCI AMS-229020	Un 60	Above Feature 2	3190±15	1500-1426 BCE (95.4%)	Wood charcoal (*Naucleopsis* sp.)
UCI AMS-229022	Un 61	Feature 2 (upper)	3015±15	1380-1346 BCE (11.9%) 1304-1207 BCE (83.5%)	Wood charcoal (*Calycophyllum candidissimum*)
UCI AMS-229023	Un 61	Feature 2 (middle)	2990±15	1280-1156 BCE (87.3%) 1146-1126 BCE (8.2%)	Wood charcoal (*Dendropanax* sp.)
UCI AMS-229024	Un 61	Feature 2 (base)	2995±15	1368-1359 BCE (1.2%) 1284-1190 BCE (83.3%) 1180-1158 BCE (5.6%) 1145-1128 BCE (5.4%)	Wood charcoal (*Calycophyllum candidissimum*)
UCI AMS-261638	Un 61	Feature 2	3070±20	1407-1270 BCE (95.4%)	Fruit (*Terminalia* sp.)
UCI AMS-261639	Un 61	Exterior of structure	3145±15	1492-1480 BCE (4.0%) 1451-1392 BCE (89.2%) 1334-1325 BCE (2.3%)	Geophyte
UCI AMS-229025	Un 61	Floor of structure	3305±15	1616-1530 BCE (93.2%) 1524-1519 BCE (2.2%)	Wood charcoal (*Swietenia* sp.)
UCI AMS-261637	Un 61	adjacent to tobacco seeds	3220±15	1510-1442 BCE (95.4%)	Wood charcoal (*Perrottetia* sp.)