

ANCIENT AND MODERN USE OF PINE AT THE SITE OF CHINIKIHÁ, CHIAPAS, MÉXICO

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Abstract:

Archaeobotanical remains of ocote pine have been recovered from different Classic Period (AD 300 - 900) Maya sites indicating use in ritual ceremonies and in household refuse for the fertilization of agricultural fields. Our results in the Palenque region, at the archaeological site of Chinikihá dating to Cal AD 620, suggest that there was no difference in the use of ocote in the residential units compared to that in the palace units. Ocote wood charcoal remains were found in ceremonial contexts, burials, household refuse deposited in home gardens, and patio's soils. We consider the ancient use of ocote pine alongside modern use of ocote in Guatemala and Chiapas, which has an economic importance with the cutting of pine sticks to sell in regional markets to use as torch for illumination and lighting daily cooking fires.

Keywords: *Pinus*, anthracology, Palenque, Nahá.

Resumen:

Uso moderno y antiguo del pino en el sitio de Chinikihá, Chiapas, México.

Restos arqueobotánicos de pino ocote recuperados de diferentes sitios del período Clásico Maya (300 – 900 d.C.) han demostrado diferentes usos que van desde rituales hasta abonos en los campos agrícolas. Nuestros resultados en la región de Palenque, en el sitio arqueológico de Chinikihá para el 620 d.C. sugieren que el uso del ocote era similar tanto en los palacios como en las unidades residenciales de los pobladores. Restos de madera carbonizada de ocote fueron identificados en contextos ceremoniales, funerarios y en los basureros de los patios residenciales. El uso moderno del ocote en Guatemala y en Chiapas es de gran importancia económica por la venta de rajas de ocote en los mercados regionales. Estas son utilizadas como antorchas para iluminar de noche y para encender los fogones de cocina.

Palabras claves: *Pinus*, antracología, Palenque, Nahá.

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1. INTRODUCTION

The ancient Maya inhabited the territories now known as Guatemala, Honduras, El Salvador, Belize and Mexico (Fig. 1). During the Classic Period (beginning AD 300), the Maya courts played a central role in articulating the complex mosaic of networks of influence, prestige and alliances that would come to shape the political "landscape" in the North Western lowlands (INOMATA & HOUSTON 2001). Ancient cities such as Palenque, Santa Isabel, Chinikihá, Pomoná, Bonampak, Yaxchilán and Piedras Negras, connected through many kinds of roads, causeways, *sacbeob*, paths, and sidewalks, exchanged such materials as textiles, ceramic, stone tools, food and drinks, cacao and other forest materials far away in Palenque's Hinterland (SILVA DE LA MORA 2008; LIENDO 2014, 2015). Trade goods were carried on the backs of porters called *mecapalers* (NAVARRETE 1978). Ancient people of Palenque and Chinikihá exchanged forest resources that they were unable to procure in their region, like pine wood. Archaeological charred pine wood is found in the archaeological record. Was the pine a sacred plant reserved in ritual practices such as offerings, and food for the gods? Was the pine a material of prestige reserved only to the inhabitants of the palace? Or was, a plant used indiscriminately by all the Maya people in the whole region in domestic

units of commoners as well as in the elite residences, to start the fire and light the night? The method we employed in Chinikihá was to sample different contexts: courtyards, burials and household refuse in the palace as in the domestic units. Collecting botanical remains from sediment using the flotation technique. We were interested in using charcoal analysis to understand the management and use of wood resources at Chinikihá, particularly non-local taxa (such as pine), and whether these practices were uniform throughout the site, or if they differed between different social classes, activities areas.

2. THE ARCHAEOLOGICAL SITE

2.1. Location

The archaeological site of Chinikihá is located in Chiapas México, near the foothills of the Sierra de Chiapas and Tabasco plains. The expanse of the civic-ceremonial core of Chinikihá, the density of its total population and the characteristics of its pattern of regional settlements, indicate the possibility that it was the head of an autonomous political entity, like Palenque, Piedras Negras and Pomoná (LIENDO *et al.* 2014). Chinikihá is 40 Km away from its neighbor Palenque, and both are within high evergreen tropical forests dominated

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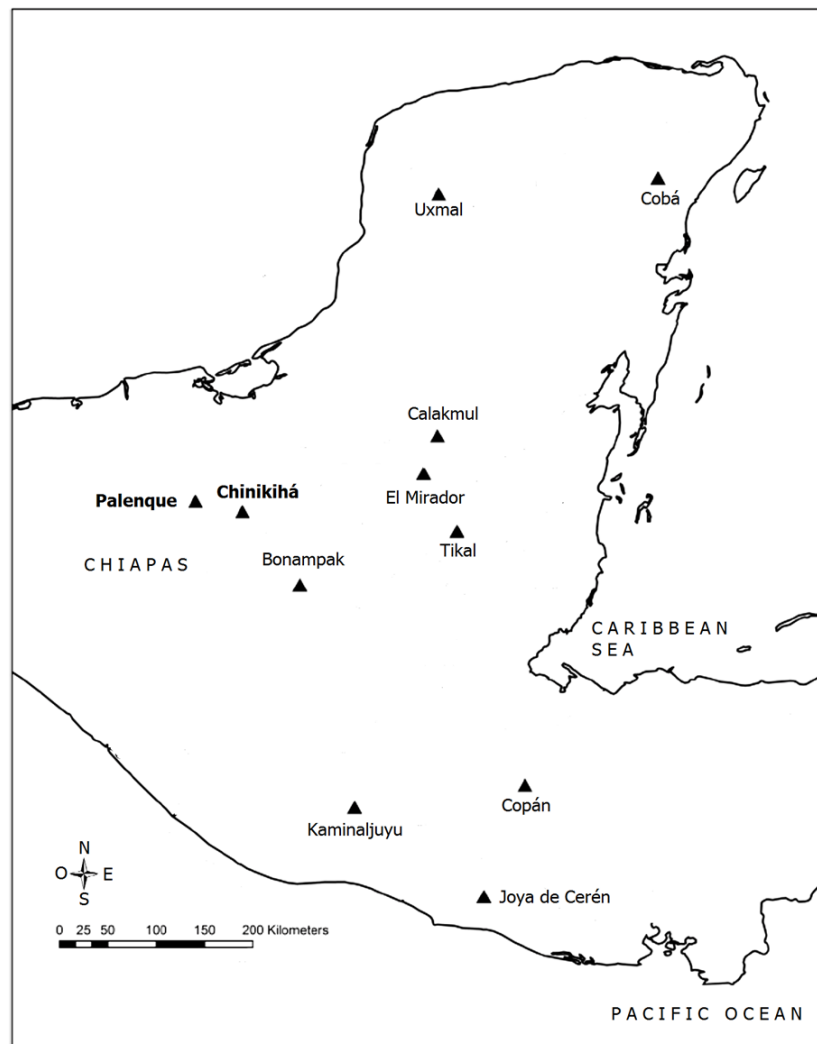


Fig.1. Maya Area.
Fig.1. Área maya.

by *Canxán* (*Terminalia amazonia*). The vegetation of Chiapas was classified by MIRANDA & HERNÁNDEZ X (1963) as *Selva alta perennifolia*, and later as *Bosque tropical perennifolio* by Rzedowski (1978). The forest of the Palenque region is rich on *Ficus*, *Psychotria* and *Piper* (GÓMEZ-DOMÍNGUEZ *et al.* 2015). The secondary vegetation of this forest is characterized by the dominance of *Trichospermum mexicanum*, a soft tree which bark is used to make ropes and mecapanes (MONTERO *et al.* 2016, VARELA & TRABANINO 2016). South of this area are the mountains of Chiapas, which have a change in forest cover, starting at 800 meters high with montane cloud forests dominated by *Tahté* (*Pinus maximinoi*), like those surrounding the lacandon lagoons of Metzabok and Nahá.

2.2. The Excavation

Chinikihá possesses a great diversity of architectural structures, including a variety of civic-

ceremonial structures, such as large plazas, a ball court, a palace and, residential patio groups (LIENDO *et al.* 2014). The sampling of archaeological sediments were carried out during the 2008, 2010 and 2012 field seasons, concentrating mainly on, (a): Operation 114 (Op. 114) located behind the Palace of Chinikihá including both ritual and domestic contexts; (b): Operations 6, 111, 112, 117 and 143 of which include burial contexts and finally; (c): Operations 8, 115, 116, 134 and 158, located in courtyards (Fig. 2).

3. MATERIALS AND METHODS

In order to maximize the total amount of carbon recovered, different recovery techniques were carried out (PIQUÉ 1999). The recovery methods employed were as follows:

- (a) Automatic recovery 2 liters of sediment by flotation using plastic buckets 20 liters capacity,
- (b) Manual recovery (direct hand-picking) when sieving and screening;

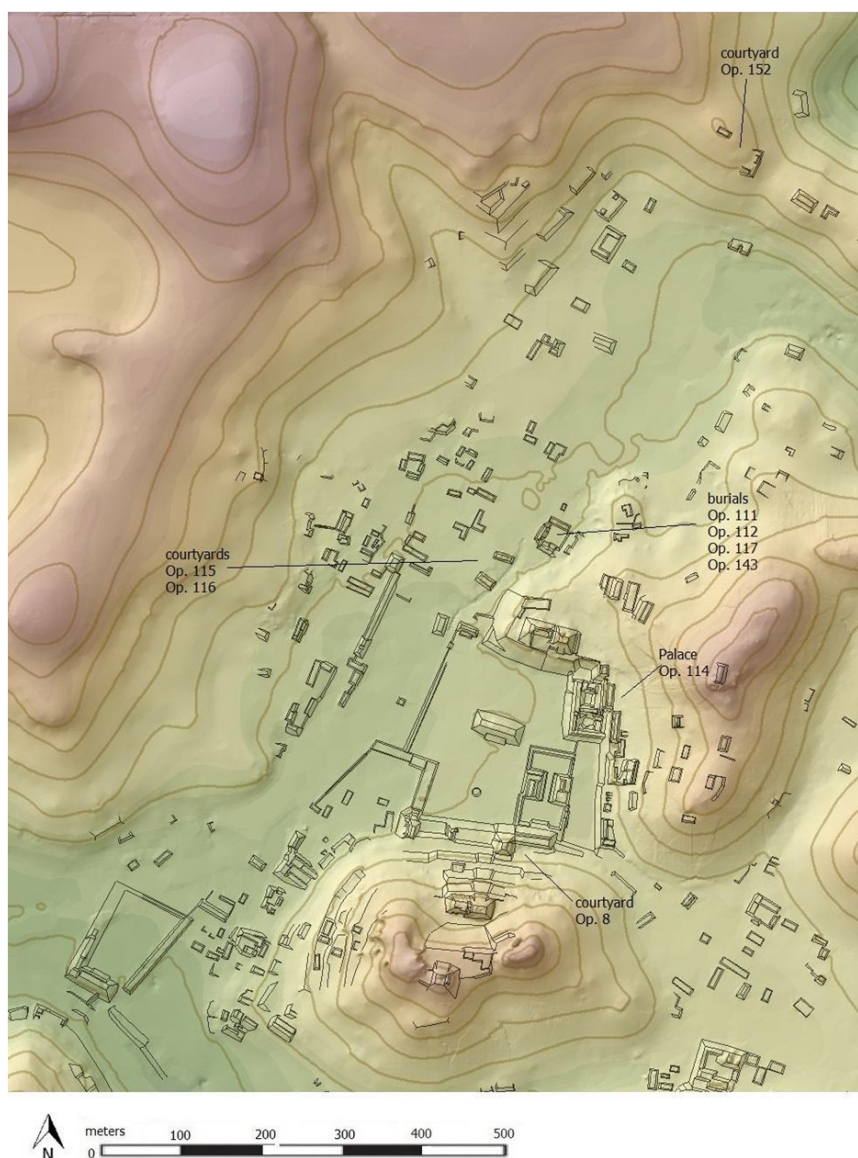


Fig. 2. Archaeological site of Chinikihá showing the operations where archaeobotanical analyses were conducted in courtyards, burials and behind the Palace.

Fig. 2. Sitio arqueológico de Chinikihá mostrando las operaciones donde análisis arqueobotánicos fueron realizados en patios, sepulturas y en el palacio.

(c) Manual recovery during excavation in the case of larger sized charcoal (more than 1 cm).

We took 20 fragments of charcoal from each sample, following the methodology conducted in the anthracological analysis of Teotihuacan by (ADRIANO-MORÁN & MCCLUNG DE TAPIA 2008). The identification was done by comparing the anatomy with our own reference collection of plants from the forests of El Petén (Guatemala) and Palenque (México), as well as with anatomical atlases (NARDI BERTI & EDLMANN ABBATE 1992; BARAJAS *et al.* 1997; MILLER & DÉTIENNE 2001). We could identify pine at the level of genus (*Pinus* sp.). Striations in the tracheids suggest compressed wood. It

was not typical for all the assemblage (Fig. 3). Reaction wood of that type may indicate physical stress on the tree during growth, or indicate the selection of dead branches for firewood. At the instance, we are not able to have a determinant conclusion without the initial diameter.

Results of the dating evidence that Chinikihá was inhabited during the Classic Period (REBOLLO *et al.* 2014). Pine fragments were dated in the Laboratory of Arizona: Sample code AA-105569 14C age 1100 \pm 30 years BP; Unmodeled Cal ' AD (620-660). The archaeobotanical remain of pine were photographed in the Laboratorio de Microscopía Electrónica y Microanálisis in Instituto de Geología at UNAM, using a SEM microscope (Fig. 3).

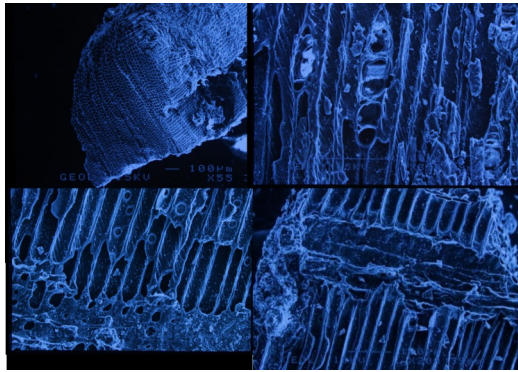


Fig. 3. Transversal section of charred pine (up and left), tangential longitudinal section (up and right), radial longitudinal section (down left and right). Scale: 100 μ m.

Fig. 3. Sección transversal de pino carbonizado (arriba izquierda), sección longitudinal tangencial (arriba derecha), sección longitudinal radial (abajo izquierda y derecha). Escala: 100 μ m.

4. RESULTS

1223 charcoal fragments were obtained from 86 samples of sediment extracted from the Palace, courtyards and burials. In this study we analyzed the presence-absence of the taxa identified to highlight those species present in the 3 contexts (palace, burials and residential courtyards). Pine is present in the trash deposit of the palace; only appears in one sample of the 5 burial sediments analyzed (Op. 117); and finally in two patios from 5 domestic units sampled (Op. 115 and 116).

Table 1. List of operations sediments analyzed in different contexts: trash deposit of the palace, burials and courtyards.
Tabla 1. Lista de operaciones con sedimentos analizados en diferentes contextos: depósito de basura en el palacio, entierros y patios domésticos.

| Operation No. | Context | Presence/Absence of archaeobotanical remains of Pine |
|---------------|-----------------------------|------------------------------------------------------|
| 114 | trash deposit of the Palace | Present |
| 6 | burial | Absent |
| 111 | burial | Absent |
| 112 | burial | Absent |
| 117 | burial | Present |
| 143 | burial | Absent |
| 8 | courtyard | Absent |
| 115 | courtyard | Present |
| 116 | courtyard | Present |
| 134 | courtyard | Absent |
| 158 | courtyard | Absent |

5. INTERPRETATION

Chinikihá villagers then had access to ocote pine to illuminate their kitchens nightly. The presence of the ocote pine (*Pinus* sp.) in all contexts indicates the widespread use of this plant resource in both elite and ceremonial contexts such as burial and everyday waste deposits in the residential courtyards throughout the periphery of the site. The pine species could correspond to coastal pine (*Pinus caribaea*) or mountain pine (*Pinus oocarpa*, *Pinus maximinoi*). Today people in the highlands still refer to ocote as the fastest fire starter (PERRY 1991). Maya people call ocote pine any pine tree that produce flammable pitch, without differentiation between various kinds of ocote pines. Ocote is an ethnotaxon, an ethnobotanical classification that include all the pines with resin (*Pinus oocarpa*, *Pinus maximinoi*, and *Pinus caribaea*). The ocote is refers to the presence of resin. Resin production is usually caused by cuts in the trunk repeatedly. But from where came the pine? Does it grow locally? Did they obtain it locally or throughout long distance exchange during prehispanic times? No pines are planted today in the lowlands of the Palenque region. The pine could come from this area in prehispanic times? If not cultivated in the site, ocote could be brought from the eastern side: Belizean coast, Quintana Roo coast, El Péten in Guatemala (from Usumacinta River to Tikal); where *Pinus caribaea* stands. Recently, Caribbean pine was identified at Lamanai in Belize (LENTZ *et al.* 2016). Another scenario could be that, ocote pine came from the highlands of the South (Sierra Madre de Chiapas). The first pine communities are observed today at 600 meters above sea level in Oxchuc, in the route from Palenque to San Cristobal de las Casas, and surrounding the lagoons of Nahá and Metzabok at 40 km from Chinikihá (Fig. 6 and 7).



Fig. 6. Nahá lagoon with pine forest surrounding.
Fig. 6. Laguna Nahá, con bosque de pino en sus alrededores.

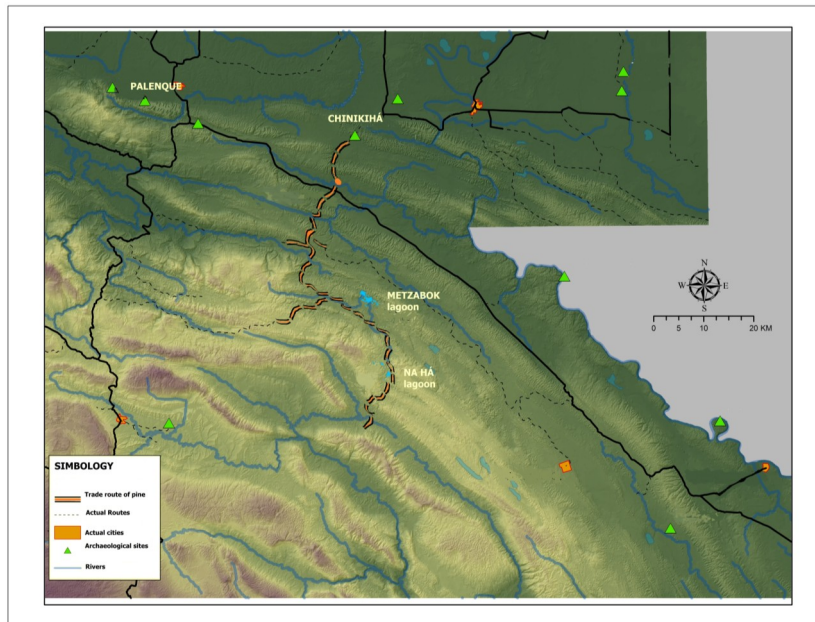


Fig. 7. Location of the archaeological site of Chinikihá showing the proposed prehispanic trade route of ocote pine from Nahá and Metzabok lagoons via Chancalá. Author: Javier López Mejía.

Fig. 7. Ubicación del sitio arqueológico de Chinikihá, mostrando la ruta prehispánica propuesta de comercio del pino ocote desde las lagunas de Nahá y Metzabok vía Chancalá. Autor: Javier López Mejía.

In 2010, up to 95.9% of the dwellings in the State of Chiapas had access to electricity, according to the Mexico National Institute of Statistics and Geography (INEGI 2010a, 2010b). According to INEGI, for that same year 1027957 of individual homes, out of a total of 1090914 had access to electricity, leaving 62 957 without electricity.

These families without access to electricity are still lighting their houses with fire generated from pine tar/resin, and many of those households that do have access to electricity still use wooden stoves to cook because of the high gas and electricity prices.



Fig. 8. Lacandona showing ocote stick and pine trunk. These are kept in the kitchen near the stove to turn it on.

Fig. 8. Lacandona mostrando raja de ocote y tronco de pino. Estos se mantienen en la cocina para encenderlo.



Fig. 9. Lacandona woman lighting the kitchen with a ocote stick.

Fig. 9. Lacandona alumbrando la cocina con un ocote.

At night, the light coming from many rural houses in Chiapas has a distinguishable red glow that comes from the intense fire produced when burning the pine tar/resin known as ocote. This is the flame that fires up the stoves to prepare food and the bon fires that keep families warm during the months of heavy rain. Ocote has also been used for rituals or ceremonial activities, but nowadays wax candles have increasingly substituted it. Ocote is lit with matches and its function is to keep the

fire's flame lit while the humid firewood is warmed and readies to catch fire.

In the markets located at the elevated parts of Chiapas, a handful of ocote, comprised of three pine sticks, currently costs two Mexican pesos. Archaeobotanical remains from the Classic Maya period from various excavations demonstrate widespread use of the ocote ranging from the Maya lowlands to the highlands, and occasionally in places far away from the pine forests (MIKSICEK 1988; RAMÍREZ-SOSA *et al.* 1996; LENTZ 1991a; 1991b; 1994; LENTZ *et al.* 1996; TRABANINO 2009).

Table 2. Remains of charred wood of *Pinus* recovered in lowlands archaeological sites far away from pine forests.

Tabla 2. Restos de madera carbonizada de *Pinus* recogidos en sitios arqueológicos lejanos de bosques de pino.

| Site | Dates | Fases | Reference |
|----------------------------|-----------------|-------------|---------------------------------|
| Dos Pilas, Guatemala | ? | Classic | LENTZ 1994 |
| El Mirador, Guatemala | AD 850-1000 | Postclassic | TRABANINO 2009 |
| Yarumela, Honduras | 1000 BC | Formative | RAMÍREZ-SOSA <i>et al.</i> 1996 |
| Copán, Honduras | 400 BC - AD 900 | Preclassic | LENTZ 1991a |
| Naco, Honduras | ? | ? | LENTZ 1991b |
| Joya de Cerén, El Salvador | AD 585-600 | Classic | LENTZ <i>et al.</i> 1996 |
| Cihuatán, El Salvador | AD 900-1200 | Postclassic | MIKSICEK 1988 |

This suggests that there was a considerable exchange network for the ocote and, given the amount of carbonized pine remains found, it is estimated that it was an accessible good. In this and other investigations, ethnography has helped with the rebuilding of the meaning of ocote in the Mayan history. “By integrating the archaeobotanical data on pine with multiple lines of analogy from ethnohistory, ethnography, iconography, and epigraphy, we suggest that pine was a recognized component of ritual activities” (MOREHART *et al.* 2005: 256).

During our visit to the Nahá community we were able to go inside a typical family kitchen. It was a big room made with wooden panels and a zinc ceiling where the women and children spent countless hours each day. The lacandon women, who were in charge of the domestic space, zealously guard the fire, considered sacred by them. They use firewood, ocote and air so the flame is kept ablaze permanently. Two stoves were there

simultaneously lit. One of them, where beans and tortillas were being cooked, stood approximately one meter tall over a dirt-filled wooden box (Fig. 11). The second one was located inside a carved hole in the dirt floor at the center of the kitchen space. This one was used to light the dark space and to warm the heavier pots.



Fig. 10. Houses in Nahá.

Fig. 10. Casas en Nahá.



Fig. 11. Stove in a kitchen at Nahá.

Fig. 11. Fogón en una cocina de Nahá.

The pine's resin is fundamental to keep the flames ablaze. Small ocote sticks are frequently added to the bonfire, sparkling as they are burnt and sending myrrh-like aroma through the air. This gives the impression of transforming the kitchen into a temple where the community feast is cooked. A lacandon woman, self-identified as a “shaman”, lit an ocote stick with matches and placed it in the bonfire to demonstrate how it is used (Figs. 8 and 9). The ocote she used came from the hillside of the Nahá lagoon, which is one of the main pine sources of the region.

6. CONCLUSIONS

The ocote was used in ancient times to light and make fire, as today. Pine was also used in rituals for its aroma and for medicine. Slits high pine

resin, can be exploited as ocote. The ocote correspond to any kind of pine species with high contents of resin. The ocote has a very important ritual use; it is omnipresent in the offerings of Zinacantán, symbolizing the corn, food for the Gods (VOGT 1993). But this ritual use is not unique and principal, and not reserved only for the inhabitants of the most prestigious residential areas. Charred remains of pine were identified in the dooryards of the domestic units too. These suggest that pine was a main element of the kitchen, present in the daily use of every family. Finally, Chinikihá is a modest archaeological site. Elsewhere from Palenque to Usumacinta River, all the inhabitants of this region might have used pine wood daily, from the grand palace to the most modest domestic group.

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