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Author

Morell-Hart, Shanti

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UCB Paleoethnobotany Lab Report #62
Analysis of Macrobotanical Remains from Rancho Ires, Site CR-337
Prepared by Shanti Morell-Hart, U.C. Berkeley

Introduction:

This report summarizes the results of the macrobotanical analysis of flotation samples recovered from excavation at the archaeological site CR-337, Rancho Ires, Honduras. The samples analyzed include several taken from various loci during excavations carried out during the 2003 field season. Bulk sediment samples were recovered from the excavation units and floated during the same field season. The floated ("Light Fraction") materials were sorted at the University of California at Berkeley Paleoethnobotany Lab. Unfortunately, few taxa were recovered in the sorting process, and many of these could not be identified, due to the generally poor preservation of the macrobotanical materials. Botanical materials were classified into general categories of Wood, Lumps (mostly parenchymous tissue), Seeds, Other, and Unidentifiable. Taxa in the *Arecaceae*, *Cactaceae*, *Poaceae*, *Solanaceae*, and *Cyperaceae* families were tentatively identified at the family, genus, or species level. The counts and weights of the suite of recovered botanical materials are here analyzed in relation to their various loci.

The following pages summarize the field methods, laboratory methods, results, and conclusions of the paleoethnobotanical analysis.

Methods:

Field methods:

Excavations at each locus proceeded according to the standard methodology employed by the Rancho Ires Project, and were conducted under the direction of Kira Blaisdell-Sloan. Sediment samples were taken from each excavated locus and bagged. The volume of each of these sediment samples varied from 4.5 to 10.0 liters.

After excavations, the bulk sediment samples were floated in a modified SMAP machine during the 2003 field season, under the direction of Kira Blaisdell-Sloan. In the course of this process, each sample was divided into Light and Heavy Fractions. A Flotation Log was maintained for this procedure. After flotation, each sample was thoroughly dried, then labeled and inserted into a plastic bag. The bags were labeled with provenance information and the contents (Heavy Fraction or Light Fraction).

The Light and Heavy fractions were both eventually removed to the University of California at Berkeley Paleoethnobotany Lab, although only the Light Fraction has been analyzed at this time.

Laboratory methods:

Once in the laboratory, the Light Fraction samples were weighed. The samples varied in weight from 0.32 to 2.61 grams. Each of the nine Light Fraction samples was then assigned a flotation and sort number, in each case as a single Site-Flotation Number string. The Light Fraction samples (hereafter simply referred to as the "samples") were divided with the use of brass geological screens into four particle sizes: >2mm, 1-2 mm,

0.5-1 mm, and <0.5 mm. This partitioning of the samples allowed for faster sorting, through the need for only a single magnification setting for the entirety of a fraction.

The samples were sorted under a low-power boom-mounted stereo microscope with a fiber optic illuminator. Only charred botanical remains were considered to be archaeological, and these carbonized materials were removed and classified as Wood, Lumps (mostly parenchymous tissue), Seeds, or Other. Wood less than 2.0 mm was not removed, and Lumps less than 1.0 mm without visible surfaces were not removed, as fragments of the materials smaller than these sizes are virtually impossible to identify even by specialists. Non-archaeological or botanical materials such as snails, bone, modern macrobotanical materials, ceramic, shell, other non-botanical charred materials, and other miscellaneous materials were not removed. All materials, however, were recorded as present or absent in each fraction size on the sorting form. Recorded as well were comments regarding the condition and contents of the sample as a whole.

Once removed, the carbonized materials were further divided into similar subclasses, where possible. Wood and Lumps were counted and weighed, and seeds and other materials were identified to the smallest possible subset. All of the recovered carbonized materials were counted, weighed, and recorded on the identification form, along with comments specific to the class or sub-class. Each class of carbonized materials was then placed in a gelcap containing a label with the class and sample number, and the combined gelcaps were placed in a larger clear plastic box. All of the remaining non-carbonized sorted materials were placed in plastic bags containing provenance information. The sorted samples were then stored in a larger cardboard box with visibly marked provenance information.

The data from the flotation, sorting, and recording forms were transferred to an Access database spreadsheet. The information from this database was then imported into Excel, for ease of analysis and visual presentation.

Results:

The sediment samples contained seeds, wood, “lumps”, and various other non-botanical remains. Recovery rates of seeds were meager, overall, although a fair amount of wood and lumps emerged in the sorting process. The identification of various taxa proved difficult due to the poor preservation of the materials and in many cases the lack of identifiable morphology or surface features. However, taxa in the *Arecaceae*, *Cactaceae*, *Poaceae*, *Solanaceae*, and *Cyperaceae* families were tentatively identified to the family, genus, or species level. Chart 1 visually details the total numbers of recovered items, and Chart 4 details the specific seed taxa counts by locus.

All of the surviving botanical materials appear to have been charred at a medium-high temperature, as they are uniformly carbonized with fairly clear morphology where the surfaces have not been distorted. The many carbonized remains which were rendered unidentifiable or almost so appear to have been subject to mechanical or biochemical processes after carbonization, that distorted surface features and eroded distinguishing morphological characteristics.

The recovery rates of carbonized materials appeared to vary not according to the volume of soil recovered but rather to the corresponding locus. The loci with the greatest initial sample volume (1-A-14, with 10.0 L) and the smallest initial sample volume (4-B-

22, with 4.5 L) had recovery rates in the middle range, relative to the other loci. The rest of the loci, all of mid-range volume (between 5.0 and 6.0 L) had the highest and lowest recovery rates. It is apparent that the recovery rates of archaeobotanical materials did not correspond with pre-floated volume alone. Recovery rates calculated by weight of the floated sample further support a hypothesis that other factors more directly affect the rate of recovery in each level. The highest recovery rates in this instance were from loci 2-B-11, which had a mid-range sized total sample weight, and 4-B-22, which had the smallest total sample weight. The lowest recovery rates were from loci 3-A-6, 5-B-4, and 3-B-9, which all had mid-range sized total sample weights. Chart 2 visually details the total item recovery rates by locus. In short, it is likely that the rate of recovery at each location had more to do with varying densities of the actual cultural deposits, rather than the pre-flotation volume or post-flotation weight of the sample.

Wood was 100% ubiquitous, and wood fragments were the most commonly recovered items at every locus except 2-C-26 and 3-B-9. There were 147 wood fragments recovered from the combined loci (53% of the total recovery), with a combined weight of 0.80 g. Lumps were the second most commonly-recovered item, but were only 63% ubiquitous across the site. 68 lumps were recovered in total (25% of the total recovery), for a combined weight of 0.11g. The recovery rates of wood and lumps did not covary, except at locus 1-A-14, where high numbers of both of these classes were recovered. Seeds numbered 48 total (18% of the total recovery, and were 89% ubiquitous. Other carbonized remains (4% of the total recovery) were extracted, but were identifiable only as charred botanical materials due to the poor preservation of their surfaces and morphology. Charts 3.1 and 3.2 visually detail the weight and counts of material classes by locus. Chart 5 details the total percentage of wood, lumps, seeds, and unknown charred botanical items recovered, as a percentage of the combined archaeobotanical assemblage.

Analysis:

Taxa information:

What follows is a summary of the archaeobotanical taxa recovered, their corresponding family with typical representatives, the known uses for the smallest identified subset, the areas where the taxa are found, the known archaeological recoveries of the taxa, the specific number recovered at Rancho Ires, select literature where the taxa are referenced, and the type of location from where the taxa were likely obtained. Chart 6 details the seed taxa recovered and the relative contribution of each taxon.

1. *Acrocomia mexicana*: coyol (sometimes cocoyol) palm

Arecaceae family.

Found throughout Mexico and Central America.

Recorded uses for *Acrocomia mexicana* include food (edible fresh fruit), beverage (fermented resin), oil, and medicine.

Archaeologically recovered from Copan (endocarps, exocarps-- Lentz 1991); Cerros (seed-- Cliff 1989); Tikal (seed-- Turner 1984); El Cajon region; Cerro Palenque (SMH); Colha (seed-- Caldwell 1980); Wild Cane and Tiger Mound (seed --McKillop 1994); and potentially other sites where *Arecaceae* taxa were identified only to the family level. Four

Acrocomia mexicana endocarps were recovered from the Rancho Ires flotation samples, two with fragments of endosperm intact.

Referenced in Lentz 1991; Crane 1986; Cliff and Crane 1989; Lentz 1989; Caldwell 1980; Lentz 2001; Lentz 1990; Joyce 1985; Henderson et al. 1995; Turner and Miksicek 1984; and McKillop 1994.

Acrocomia mexicana are commonly grown in house gardens.

2. cf. *Arecaceae*: unknown genus

Family of palms, including *Attalea cohune* (cohune palm).

Found throughout Mexico and Central America.

Recorded uses for various species of the family include food (fruit, edible kernels, edible heart), medicine, construction, roofing (leaves), beverage (fermented resin), and utensils. Archaeologically recovered from Actun Nak Beh (endocarps) (*Attalea cohune*); Copan (endocarps, exocarps), Cerros, El Cajon region, Cerro Palenque, Colha (*Acrocomia mexicana*); and Copan (endocarps) (*Bactris* sp.). One very small fragment was recovered at Rancho Ires, consistent with the general morphology of *Arecaceae* fruit endocarps. This is a very small fragment, making it difficult to positively identify the species or even genus through morphological characteristics.

Various genera referenced in Morehart 2002; Lentz 2001; Lentz 1991; Roys 1931; Tozzer 1941; Alcorn 1984; Cliff and Crane 1989; Crane 1986; Lentz 1989; Joyce 1985; Caldwell 1980; Lentz 2001; Lentz 1990; Henderson et al. 1995.

Various economic species of palms are commonly grown in house gardens.

3. cf. *Mammillaria* sp.: coyotillo

Cactaceae family.

Found throughout Mesoamerica.

Recorded uses for various species of *Mammillaria* sp. include food (edible fresh and dried fruits).

No previous recorded instance of archaeological recovery of *Mammillaria* in Mesoamerica.

Only one fragment was recovered from the Rancho Ires samples. The fragment is only 50% complete, but has an amazingly preserved epidermis and part of the embryo is intact. The fragment is 100% consistent with *Mammillaria* species, however, as it is only half intact this identification cannot be absolutely verified. May perhaps be *Mammillaria ruestii*, the only *Mammillaria* noted in Honduras by Sutherland (1986).

Referenced in Sutherland 1986; Casas and Barbera 2002.

Economic species of cacti are commonly grown in house gardens. *Mammillaria* spp. are found wild throughout Mesoamerica.

4. cf. *Zea mays*: maize

Poaceae family.

Found throughout the Americas.

Recorded uses include edible grain in tortilla, tamal, atole, horneado (pib'il); feed for pigs, dogs, and chickens; as cooking wrapper (leaves).

Archaeologically recovered from Actun Chapat (cob fragments), Actun Chechem Ha (cobs and kernel fragments; starch grains), Barton Creek Cave (cobs, kernels, stems,

husks); Cueva de las Pinturas, Naj Tunich, Mayahak Cab Pek (cobs), and Copan (cupule, kernel). Only one potential kernel fragment was recovered from the Rancho Ires samples. Although no portion of the surface or testa remains, it has been tentatively identified as *Zea mays* due to the similarity in the heat rupture pattern of the tissue. Referenced in Atran 1993; Morehart 2002; Brady 1997; Brady 1989; Brady 1995; Goldstein 1999; Lentz 1991; Lentz 2001; Doebley 1990... and many more. Grown in the *milpa*.

5. *Poaceae*: unknown genus

Large family of grasses and grains. Family of *Zea mays* (maize).

Found throughout the Americas.

Paspalum spp. and *Setaria* spp. are other weedy species in this family, recorded as used for matting, bedding, and other purposes.

Archaeologically recovered from everywhere that *Zea mays* has been found, among other species. Only one very small *Poaceae* seed was recovered from the Rancho Ires samples. The seed coat was present and the cells appeared well-preserved.

The *Poaceae* spp. recovered from samples at Rancho Ires did not match any of the above species (*Zea*, *Paspalum*, *Setaria*), nor any *Poaceae* species currently housed in the UCB reference collection. But as *Poaceae* is a very large family, comprised of thousands of species (with new ones occasionally recorded), this is unsurprising.

Poaceae species grow in almost every sort of ecological condition.

6. *Nicotiana* sp.: tobacco

Solanaceae family.

Found throughout Mesoamerica.

Recorded uses include smoke, snake repellent, medicine for ticks and colmoyote worm.

Noted in the *Ritual of the Bacabs* as medicine for asthma, bites and stings, bowel complaints, chills, fever, seizures, sore eyes, skin diseases, and urinary complaints; cited in incantations for eruptions, fever, snake in the abdomen, a worm in the tooth, and the placenta.

Only one seed of *Nicotiana* has been previously recovered in the greater Maya area, also from Honduras (Rachel Cane).

Only one fragment of a *Nicotiana* seed was recovered from the Rancho Ires samples.

Although only a fragment, the size and surface reticulation is unmistakably characteristic of *Nicotiana* species.

Referenced in Lentz 2001; Carlson (2006 lecture); Cane (unpublished lab report); Atran 1993; Heiser 1992; Goodspeed 1954; Pickersgill 1977; Roys 1965.

Tobacco is commonly grown in house gardens and orchard areas.

7. cf. *Solanaceae*: unknown genus

Family of potato, tomato, tobacco, and chile pepper.

Species from this family have been recovered archaeologically everywhere that chile, tomato, tobacco, and potato have been found. The single *Solanaceae* seed fragment recovered from the Rancho Ires sample did not match any known economic species nor any species housed in the UCB reference collection.

This is a fairly common family of wild and domesticated species that grow in a variety of ecological conditions.

8. cf. *Carex* sp.: sedge

Cyperaceae family.

Found throughout Mesoamerica. *Carex* genus contains at least 532 species.

Lentz (1991) notes possible use as bedding or matting.

Not recorded as being previously recovered in the greater Maya area, although another genus (*Scleria*) of this family was recovered from Copan (seed).

Three tentatively identified *Carex* sp. seeds were recovered from the Rancho Ires samples.

Referenced in Lentz 1991.

This is a fairly common genus of wild species that generally prefer wetlands.

9. *Asteraceae*: unknown genus

Large family of various weedy species. Family of *Helianthus annuus* (sunflower).

Found throughout the Americas.

Recorded uses for other species in this family include digestive tranquilizer (*Artemisia* sp.) and edible seed (*Helianthus annuus*).

Species from this family have not previously been recovered archaeologically in the Maya area. 4 representatives of the *Asteraceae* family were recovered from the Rancho Ires samples, all of the same species. Three were only fragments, and one was thickly clay-coated.

Referenced in Lentz 2001 and at the CICY Jardin Botanico.

The *Asteraceae* sp. recovered from Rancho Ires did not match either of the above species (*Artemisia*, *Helianthus*), nor any *Asteraceae* species currently housed in the UCB reference collection. But as this is a very large family, comprised of thousands of species (with new ones occasionally recorded), this is unsurprising.

Asteraceae species grow in almost every sort of ecological condition.

10. UNKN seeds: various unknown species

These appear to be predominantly weedy non-domesticated species. May have been used in everything from medicine to animal fodder to fuel, but do not match any seeds currently contained in reference collection. Numbered to differentiate between distinct species. (e.g.: UNKN 1, UNKN 25, etc.)

11. Lumps: various unknown species

These are large lumps of parenchymous root or tuber tissue, or stem storage tissue. May be from *Manioc esculenta* (manioc), *Ipomoea batatas* (sweet potato), or similar, but remain unidentified at this time.

12. Wood: various unknown species

Charred wood fragments. May be from a large variety of wood species, or only a few, but remain unidentified at this time.

Contextual information:

This section details the recovered remains, by context. Summarized are the notes about each context, and the taxa recovered from within each locus. Radiometric or AMS dating of selected archaeobotanical remains could perhaps serve to pinpoint within a few hundred years the temporal context of each locus from which the archaeobotanical materials come. In the current study, however, no comparisons can be drawn between loci.

1. 2-B-11 : cultural locus; 59-65 cm BD

Sort number: CR-337-A

This locus was noted as being associated with the appearance of midden-like area of sediment, and “puddled bajareque”. It was also noted as being surrounded by structures possibly associated with food preparation, storage, and waste disposal activities.

It was noted during excavation that the area was artifact rich, and possibly a midden.

During sorting, the roots were very clumped together. Most of the carbonized seeds were recovered from > 0.5 mm fraction. In the absence of a flotation number, the sort number was assigned as “A”.

This locus had the high diversity of species, with 5 lumps, 37 wood fragments, 5 unknown botanical parts, one *Acrocomia mexicana* seed, 3 cf. *Carex* sp. seeds, one unidentifiable seed, one “Unkn 12” seed, 1 *Poaceae* sp. 2 seed, 1 “Unkn1” seed, and 1 cf. *Mammillaria* sp. seed. The *Acrocomia mexicana* and *Mammillaria* sp. seeds would be consistent with likely food preparation areas. In general, the charred materials are consistent with burned residential trash or the residue of material from a hearth.

2. 3-A-6 : cultural locus; 37-46 cm BD

Sort number: CR-337-34

This locus was noted as being associated with a dark greyish brown silty loam, and abundant material culture including burnt bone, obsidian, jaw bone, and ceramic.

It was noted during excavation that a bajareque concentration at locus 5, and hearth-like material at 58 cm BD.

During sorting, the roots were extremely clumped together, and thus the >2mm fraction, once de-clumped, ended up a range of particle sizes.

This locus contained few archaeobotanical remains: 8 wood fragments, 1 *Asteraceae* sp. 1 seed, and 1 unknown botanical part. The *Asteraceae* sp. 1 is a likely incidental weed species.

3. 3-A-16 : cultural locus; 49-59 cm BD

Sort number: CR-337-46

This locus was noted as having what appeared to be a hearth-like feature at 58 cm depth. It was noted during excavation that small amounts of material culture emerged from this area.

Both the heavy fraction and light fraction were sorted from this sample, but nothing was recovered from the heavy fraction. During sorting, very small bone fragments were noted in the sample. The botanical materials were fairly clay-coated, and most had intact epidermal tissue, but many were fragmented.

This locus contained 35 wood fragments, 4 lumps, 3 *Asteraceae* sp. seeds, 4 “Unkn 1” seeds, and one unidentifiable botanical part. The charred wood fragments are consistent with the description of a “hearth-like feature”. The *Asteraceae* seeds are likely incidental weed species.

4. 1-A-14 : cultural locus; 57-70 cm BD

Sort number: CR-337-B

During excavation, a large pot break was noted in the northwest corner of this area, as well as a general concentration of unspecified cultural material.

During sorting, very small bone fragments were noted in the sample. In the absence of a flotation number, the sort number was assigned as “B”.

The recovery rates of wood and lumps covaried in this locus, where high numbers of both of these classes were recovered. The wood fragments were generally larger than those recovered from other samples. The sample contained 45 wood fragments, 29 lumps, 2 “Unkn 6” seeds, 1 *Acrocomia mexicana* endocarp fragment, 1 *Nicotiana* sp. seed, and one cf. *Solanaceae* sp. seed. These charred materials are consistent with burned residential trash or the residue of material from a hearth.

5. 2-C-26 : cultural locus; 80-88 cm BD

Sort number: CR-337-76

This locus was noted as being associated with a pit that had a complex history, involving a burial, an oven/kiln feature and several paleosurfaces. 5 distinct occupational surfaces were identified in this area, 3 domestic and associated with food preparation

It was noted during excavation that the locus was a segment of a pit or oven feature.

Contained in this locus was a concentration of materials, including animal bone and a few pieces of human bone.

During sorting, it was noted that the >0.5 fraction contained lithic microdebitage.

This locus contained the lone (possible) representative of *Zea mays*—a partial kernel. It also contained 6 wood fragments, 25 lumps, one “Unkn 5” seed, and 2 unidentifiable botanical fragments.

The high number of lumps is unusual, and may represent the processing and cooking of roots or tubers. The relatively few fragments of wood recovered may indicate the use of *pib*-style cooking, where rocks are heated in a fire, and then removed and buried with animals and/or roots or tubers to slow cook them, sometimes for several days. As this is a single small sample, however, such a hypothesis represents pure speculation.

6. 3-B-9 : cultural locus; 41-51 cm BD

Sort number: CR-337-108

It was noted during excavation that this was a sandy pebbly area; “cascajo”.

In this locus, only 2 wood fragments, 7 “Unkn 1” seeds, 1 “Unkn 2” seed, and 7 “Unkn 3” seeds were recovered. The seeds are all extremely small.

7. 4-B-22 : cultural locus; 50-60 cm BD

Sort number: CR-337-156

This locus is a midden context in the southeast corner of the excavation unit. Recovered from this locus was a variety of materials including ceramics, carbon, jutes, bone, and obsidian.

It was noted during flotation that ceramic and bone remained in the Heavy Fraction of the sample.

As there was very little material remaining after flotation, the sample was very quickly sorted.

From this locus, only 1 cf. *Arecaceae* sp., 7 wood fragments, and 5 lumps were recovered.

8. 5-B-4 : cultural locus; 31-40 cm BD

Sort number: CR-337-93

This locus was noted as being associated with a bajareque dump on the west wall.

It was noted during excavation that the soil was a dark greyish brown, silty loam to silt, with small bits of bajareque.

During sorting, few charred botanical specimens were noted.

Only 7 wood fragments were recovered from this locus, as well as one very small thorn or prickly fragment from an unidentifiable species.

9. 4-A-5 : cultural locus; **cm BD**

Sort number: CR-337-C

The only two items analyzed in this sample were two *Acrocomia mexicana* carbonized endocarp fragments removed from the excavation screen or unit. These two fragments have since been destroyed for AMS dating purposes.

Conclusions:

Although many taxa were recovered from the excavations at Rancho Ires, the exact uses of various botanical remains in many cases are difficult to ascertain. The recovered archaeobotanical materials indicate the use of several typical economic food species, as well as several other species that also may have been used for food, or perhaps for other purposes. Although there are several unknown species present in the assemblage, as these species are not currently known to have specific economic uses, it is likely that they simply served as tinder or fuel. A few general statements may be made about the particular taxa recovered.

Various palm (*Arecaceae*) species are recorded as being used for food, medicine, construction, roofing, beverage, and utensils. As *Arecaceae* species have been recovered from many other archaeological sites, have a multitude of recorded uses, and present an extremely durable endocarp, it is no surprise that fragments were recovered from the flotation samples. The ubiquity of coyol (*Acrocomia mexicana*) endocarp fragments, in particular, comes as no surprise, as this particular species has an endosperm similar to coconut, a mesocarp described as “creamy”, and a range of other uses from fermented beverage ingredient to medicine. The durability of this species’ endocarp no doubt also explains the abundance of this species in the overall assemblage.

The tobacco (*Nicotiana* sp.) seed is an intriguing element of the archaeobotanical assemblage. The range of common uses for this species, from medicine to repellent,

render it a common and beneficial taxon. Moreover, its recorded use in ritual activity mark it as an unusually special plant. Although recorded as having fewer uses, the coyotillo cactus (*Mammillaria* sp.) seed is an equally interesting element of the assemblage. It is likely the fruits of this cactus were consumed, although the presence of this species in the assemblage may indicate other as yet unknown activities. Neither of these taxa is likely to have arrived in the assemblage through purely natural processes.

Maize (*Zea mays*), considered the staple crop of the Maya area, was also potentially recovered. As this is a very tentative identification, however, little more will be noted, aside from the fact that it is surprising that so little *Zea mays* material appeared in the archaeobotanical assemblage. It is also significant that no bean (*Fabaceae* spp.), chile (*Capsicum* spp.) or squash (*Cucurbita* spp.) remains were recovered from any of the samples. These species, considered common crops throughout Mesoamerica, have been recovered from flotation samples at other sites in Mexico, Guatemala, Belize, and El Salvador. Their absence in the samples here may indicate different processing or cooking areas, different cooking methods, or simply unusually poor preservational conditions.

The *Poaceae*, *Asteraceae*, *Solanaceae*, and *Carex* species recovered at Rancho Ires do not match known economic species of the greater Maya area. Although it is possible that these taxa served unknown ritual, medicinal, dietary, or other purposes, any assignation beyond “fuel” would be pure speculation. All other recovered seed species are unknown at this time, and do not match examples in the botanical reference collection at UCB.

In terms of procurement, three of the positively-identified taxon classes may have come from a house garden—the cactus fruit seed (*Mamillaria* sp.), tobacco fruit seed (*Nicotiana* sp.), and the palm fruit seeds (*Arecaceae* sp., *Acrocomia mexicana*). The presence of cactus fruits and palm fruits suggest a concordance with ethnographically and ethnohistorically recorded common food species. The presence of tobacco fruits suggests the use of the tobacco plant, though not likely the fruit itself. The rest of the species may have been obtained from almost any location, and either opportunistically gathered or deliberately grown. The various taxa represented may represent the exploitation of a wide range of ecological niches, but the wide range of ecological conditions in which many of the recovered taxa survive makes this statement difficult to verify.

As charred wood fragments were recovered from all analyzed Light Fraction samples, it is likely that the disposal of this material often occurred in undesignated areas. The high counts of charred wood in a few particular contexts, however, point to possible *in situ* activities at these locations, whether through the use of cooking or hearth features, or the use of specified hearth ash disposal areas. In particular, loci 2-B-11, 3-A-16, and 1-A-14 are distinguished by their high numbers of archaeobotanical materials, particularly wood. The assemblage of locus 2-C-26 is also noteworthy, containing as it does a large number of lumps and a relatively small number of charred wood fragments.

The previous results suggest a few potential directions for future research. First, although sediment sample volume is not an exact indicator of eventual recovery rates, in general a greater volume of sediment would lead to a much higher recovery rate of archaeobotanical remains. Second, the flotation method may be improved through the heavy use of a deflocculant such as sodium bicarbonate, or, in the case of materials with strong potential for dating, the deflocculant sodium hexametaphosphate. Third, the current results would be much improved by an analysis of the recovered wood fragments

by a specialist in this field, as the large quantities of wood recovered would likely have much to say about local ecology and use of tree species. Finally, a micro analysis of the starch grains, phytoliths, and/or oxalic crystals potentially present in the charred “lumps” would serve to elucidate the role of root species in the cuisine of the Prehispanic occupants of this site.

