Analysis of Plant Remains from the 8GU114 and 8LI2 Sites

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Introduction

Archaeological plant and animal assemblages represent only a small fraction of what was originally used and deposited by humans in open-air settings. Natural and cultural factors can significantly modify organic remains, resulting in recovered assemblages that differ dramatically from the original deposits. As archaeologists, we examine collections that have undergone a series of processes—from the original selection of plants and animals by humans, to food preparation, cooking, discard, animal and insect scavenging, burial, decay, and weathering, to the recovery of food residues by archaeologists. Using standard methodological procedures for sampling, quantification, and analysis allows us to make sense of our assemblages in spite of the deleterious effects of these processes. Here we report on the identification and analysis of the archaeobotanical assemblages from the 8GU114 (Lighthouse Bayou) and 8LI2 (Yon Mound and Village) sites in northwestern Florida. The assemblages represent roughly contemporary Lamar phase occupations dating to roughly A.D. 1680-1730. Waterscreened (WS) and floated (F) soil samples constitute the 8GU114 (WS=5, F=17) and 8LI2 (WS=5, F=4) assemblages.

Recovery and Preservation Bias

The circumstances under which plants preserve best archaeologically involve extreme conditions (e.g., exceptionally wet, dry, or cold environments) that prohibit decomposition of organic matter (Miksicek 1987). Plants can also preserve through exposure to fire, which can transform plant material from organic matter into carbon (Miksicek 1987). The likelihood that a plant will become carbonized varies according to the type of plant, how it is prepared and used, and whether it has a dense or fragile structure (Scarry 1986). Plants that are eaten whole are less likely to produce discarded portions that may find their way into a fire. Plants that require the removal of inedible portions (e.g., hickory nutshell, corn cobs) are more likely to find their way into a fire, and thus into the archaeological record. Inedible plant parts represent intentional discard that is often burned as fuel. Moreover, because inedible portions tend to be dense and fibrous, they are more likely to survive the process of carbonization than the edible parts (e.g., hickory nutshell vs. nutmeats). Physical characteristics are also important for determining whether or not a plant will survive a fire. Thick, dense nutshells are more likely to survive a fire than smaller, more fragile grass seeds. Food preparation activities also affect potential plant carbonization. The simple process of cooking provides the opportunity for carbonization through cooking accidents. Foods that are conventionally eaten raw, however, are less likely to be deposited in fires than cooked foods. Some plants that find their way into the archaeological record in carbonized form were not eaten at all. Wood fuel is the most obvious example. Other non-food plants that become carbonized are incidental inclusions, such as seeds blown by wind dispersal (Miksicek 1987; Minnis 1981; Scarry 1986). Indeed, most secondary invaders are weedy species with lots of seeds (e.g., cheno/am plants) (Minnis 1981).

While we cannot ever hope to know the absolute quantities or importance of different plants in any past subsistence economy, the preservation and recovery biases discussed above do not prohibit quantitative analyses of archaeobotanical assemblages. The most commonly used plant resources in any subsistence economy are more likely to be subject to activities that result in carbonization (e.g., through fuel use and accidental burning) and ultimately, deposition (Scarry 1986; Yarnell 1982). Thus, we can quantitatively examine the relative importance of commonly-used plant resources through time and across space.

Quantification Methods

Quantitative methods in archaeobotany have developed significantly over the past several decades, and as a result, have been a subject of much critical discussion (Hastorf and Popper 1988). The most common methods for recording and quantifying plant remains are counts and weights. Because of problems with comparability between different types of plant taxa, however, raw (or absolute) counts and weights are not appropriate comparative measures (Scarry 1986). For example, denser taxa yield higher weights than more fragile taxa, and some taxa yield higher seed counts than others (e.g., grasses versus fruits) (Scarry 1986). Thus, using absolute counts or weights to summarize plant data is highly problematic. Most archaeobotanists agree that absolute counts are inadequate for assessing past people-plant interactions in that they do not control for biases related to preservation and sampling error (Kandane 1988; Miller 1988; Popper 1988; Scarry 1986). Absolute counts and weights are simply raw, unstandardized data.

One way to avoid the problems of absolute counts/weights is through the use of ubiquity measures (Godwin 1956; Hubbard 1975, 1976, 1980; Popper 1988; Willcox 1974). This type of analysis is essentially a presence/absence analysis that sidesteps the problems of counts and weights by measuring the frequency of occurrence instead of abundance. In other words, ubiquity analysis measures the number of samples in which a taxon was identified, as opposed to the number of specimens represented by that taxon. The researcher first records the presence of a specific taxon in each sample, and then computes the percentage of all samples in which the taxon is present (Popper 1988). For example, if acorn shell is present in four out of ten samples, then its ubiquity value is 40%. Thus, each taxon is evaluated independently (Hubbard 1980). Because different types of plants are disposed of differently, direct comparisons of ubiquity values between taxa are problematic (Hubbard 1980:53). For example, a 70% ubiquity value for hickory nutshell would not be equivalent to a 70% ubiquity value for beans as these categories have different preservation opportunities—hickory nutshell represents a processing by-product often used as fuel, while beans represent edible portions.

As with any quantitative measure, ubiquity analysis has its disadvantages. A sufficient number of samples is necessary to provide meaningful results as using too few samples creates a high likelihood of sampling error. Hubbard (1976:60) suggests a minimum of 10 samples. Moreover, although ubiquity analysis may mitigate for preservation biases, it is not immune to them (Hubbard 1980:53; Scarry 1986:193). Most importantly, because ubiquity deals with occurrence frequency and not abundance, it can potentially obscure patterns where occurrence frequency does not change but abundance does (Scarry 1986). As Scarry (1986:193) notes: "the frequency with which a resource is used may remain constant, while the quantity used varies." For example, a family may consistently eat corn on a daily basis, but the quantity they consume may vary from day to day. Despite these weaknesses, ubiquity analysis is a good starting point and can provide meaningful results when used alongside other measures.

While ubiquity measures may sidestep the problems inherent in absolute counts, it does not provide a means for calculating relative abundances of different plant taxa. Using comparative ratios is one way of determining the relative abundances of different plants. Essentially, calculating a ratio is a means of standardizing raw measures. In other words, we can deal with the problems of absolute counts and weights by standardizing them in terms of some constant variable (Miller 1988; Scarry 1986). The density measure standardizes data in terms of soil volume—the absolute count or weight of carbonized plant material (for individual taxa or for larger collapsed categories, e.g., corn kernels or corn) is divided by total soil volume for each sample or context. Density measures calculate the abundance of plants per liter of soil, and it is generally assumed that larger volumes of soil will yield more plant remains. However,

differences in the context and manner of deposition between soil samples structure the relationship between soil volume and the size of the plant assemblage. For example, a 10 L soil sample from an intact house floor would probably yield a smaller sample of carbonized plant remains than a 10 L soil sample from a refuse midden, because people tend to keep their houses cleaner than their trash dumps. Thus, density measures are useful in determining feature function.

Standardizing by soil volume, however, does not control for the range of non-plant related activities that contribute to the deposit from which the soil sample derives. In other words, the density measure does not consider plant remains in terms of plant-related activities, but rather in terms of all of the activities that are represented in the deposit. Thus, if the analyst is interested in determining the importance of a specific plant relative to the other plants in a sample or context, then density measures may be inadequate. Rather, standardizing by plant weight might be more appropriate (Scarry 1986). Unlike the density measure, standardizing by plant weight considers the contribution of a specific plant or category of plants solely in terms of plant-related activities. As a result, a plant weight ratio more accurately reflects spatial and temporal differences in plant use. As a quantitative category, plant weight is a sum of weights recorded for all carbonized plant specimens per sample or context. Thus, for each sample, there is a total weight of plant material—this figure is the denominator used to standardize the variable of interest.

Overall, ratios are useful quantitative tools that overcome some of the problems of absolute counts. It is important to understand, however, that ratios reveal only the relative importance of plants within varied depositional contexts, not the absolute dietary contribution of actual resources used in the past (Scarry 1986). For the purposes of the present analysis, we engage in qualitative and quantitative analysis of the plant data with particular focus on exploring temporal and spatial patterning.

Laboratory Procedures

Flotation samples from the 8GU114 and 8LI2 sites all measure nine liters in volume. These samples arrived having been sorted into three fractions according to screen size: A fraction (0.25”, 6.3mm), B fraction (0.034”, 0.864 mm), and C Fraction (0.0116”, 0.3mm). Although the materials from these fractions were processed and sorted separately, data from the three fractions were combined for analysis.

Waterscreened samples from the study sites were processed in the field by using water to pass excavated soil through an 1/8” (3.2 mm) screen. Residues not passing through the screen were collected for analysis. For sorting purposes only, the same procedures for sorting a fraction of a flotation sample were applied to each waterscreened sample.

According to standard practice, waterscreened residue and each flotation fraction (A, B, C) was weighed and then sifted through 2.0 mm, 1.4 mm, and 0.7 mm standard geological sieves. Carbonized plant remains were sorted in entirety down to the 2.0 mm sieve size with the aid of a stereoscopic microscope (10–40 X). Residue less than 2.0 mm in size was scanned for seeds, which were removed and counted; in addition, taxa encountered in the 1.4 mm sieve that were not identified from the 2.0 mm sieve were also removed, counted, and weighed. Corn cupules and acorn nutshell were also collected from the 1.4 mm sieve as these tend to fragment into smaller pieces and can be underrepresented in the 2.0 mm sieve.

Botanical materials were identified with reference to the paleoethnobotanical comparative collection at the University of California, Santa Barbara (UCSB) paleoethnobotany lab, various seed identification manuals (Martin and Barkley 1961; Delorit 1970; USDA PLANTS Database 2019), and Minnis (2003) which allowed us to identify the range of taxa native to the region. Taxonomic identification was not always possible—some plant specimens

lacked diagnostic features altogether or were too highly fragmented. As a result, these specimens were classified as "unidentified" or "unidentified seed." In other cases, probable identifications were made—for example, if a specimen closely resembled a corn cupule, but a clear taxonomic distinction was not possible (e.g., the specimen was highly fragmented), then the specimen was identified as a probable corn cupule and recorded as "corn cupule cf.".

Once the plant specimens were sorted and identified, we recorded counts, weights (in grams), portion of plant (e.g., corn kernels versus cupules), and provenience information. Wood was weighed but not counted, and no wood identification was conducted. Generally, most of the seeds identified in the samples were too small to weigh, and thus only counts were recorded. Hickory nutshell and corn remains were identified only as fragments and were both counted and weighed. Other than counts and weights, no other measurements were taken on any specimens. In some cases, we sub-sampled selected samples that were extremely large (exceeding 500 grams in weight). These samples were weighed and then systematically split using a riffle splitter; some samples were split in half and others in quarters depending on the overall weight of the sample. Counts and weights from the selected subsample were extrapolated using the total sample weight.

Basic Results

This section presents the results of the identification of carbonized plant remains from the 8GU114 and 8LI2 sites. Combined plant data from waterscreened and flotation samples are summarized in Tables 1 and 2. Raw counts and weights are provided for each taxon; plant weight, wood weight, soil volume per sample, and total soil volume are also provided. Samples from 8GU114 yielded 21 identifiable plant taxa, while 8LI2 samples yielded one. Notably, the soil volume of the 8GU114 flotation assemblage (153L) is much larger than that for 8LI2 (36L), providing greater opportunity for the recovery of rare taxa. Taxa identified in these assemblages include corn, nuts, fleshy fruits, and miscellaneous seeds/plant material with economic and/or medicinal uses (see Tables 1 and 2).

Corn (*Zea mays*) was the only cultigen identified at the 8GU114 site and was not present in the 8LI2 assemblage. Two maize kernels (Shell Pile 2) could be securely identified (Figure 1), while five cupules and kernels (Shell Pile 3), inedible and edible portions, were tentatively identified due to fragmentation (Figure 2). Based on the low counts and prevalence of kernels over cupules, it is possible that this maize was acquired through trade and not grown on site. Our findings represent the earliest identified corn from this region of Florida (Nancy White personal communication 2019), though they do not eliminate the possibility that it entered the region earlier. Few archaeobotanical studies have been conducted on late prehistoric and protohistoric period sites in Florida; however, the database is growing due to burgeoning interest in subsistence research (Kelly et al. 2006).

Nutshell recovered from the 8GU114 site includes acorn (*Quercus* sp.), hickory (*Carya* sp.), and black walnut (*Juglans nigra*). Walnut family (Juglandaceae) had the highest density of all nuts in the 8GU114 assemblage, followed by hickory and acorn. Most of the identified walnut family and hickory specimens and a small amount of acorn derive from Level 2 of Shell Pile 2C (Bag # 02-14). Acorn is mostly concentrated in Level 2 of Shell Pile 2S (Bag # 01-44), found in association with other food remains. Overall, most of the nuts in the 8GU114 assemblage derive from Shell Pile 2, primarily the central and southern portions. For the 8LI2 site, hickory was the only identified nut taxa, with only one identified shell fragment.

Recovered nuts, walnut, hickory, and acorn, all vary in terms of the ways that indigenous peoples of Southeastern North America processed these resources. While the nutmeats of walnuts can be easily extracted from the shell, hickory nuts and some acorns require extensive processing

before they are rendered palatable (Petruso and Wickens 1984). The hickory kernels are so tightly enmeshed in the interior shell that picking the nutshells from the cracked shell casing is a time-consuming task. Instead, hickory nuts were generally pounded into pieces and boiled to extract the oil (Ulmer and Beck 1951). The process of boiling the pounded hickory nuts separates the pieces of shell, which sink to the bottom of the pot, from the oil, which rises to the top as the nutmeats dissolve and can be skimmed off or decanted. This oil or milk would then be used as an added ingredient in soups and stews, as a condiment for vegetables, or as a general sauce or beverage (Scarry 2003; Talalay et al. 1984).

Acorn processing depends upon whether the nuts derive from white or red oak trees. Nuts from the red oak are high in tannin and are extremely bitter as a result. White oaks, however, yield sweeter nuts; the nutmeats from these acorns can be used for cooking immediately after extraction from the shell (Scarry 2003). The tannin present in the bitter acorns, however, requires an additional processing step. Leaching the tannin from acorns can be accomplished either by soaking them in water, or parching and then boiling them with an alkaline substance such as wood ash. Once processed, acorns were generally ground into a fine meal, which could then be used to make gruel, bake bread, or thicken stews. Less often, acorns were boiled and the oil extracted (Swanton 1944:260, 277).

Fleshy fruits recovered from the 8GU114 samples include grape (*Vitis* sp.), hackberry (*Celtis* sp.), pear (*Pyrus* sp.), wax myrtle (*Myrica* sp.), and persimmon (*Diospyros virginiana*); fruits were not present in the 8LI2 assemblage. Wax myrtle (Figure 3) is the most abundant according to density and is present in all sampled shell piles. Although the fruit is consumable (Kunkel 1984), the leaves of this plant can also be used to flavor soups/stews or brewed into a tea (Facciola 1990). Ethnohistoric sources indicate it was used to treat stomachaches, headaches, whooping cough, and a variety of other ailments (Chevallier 1996; Moerman 1998). The Seminole, Creek, and Choctaw used wax myrtle leaves as a tobacco substitute or to extend its use life (Austin 2004; Hutton 2010). Grape seeds recovered from 8GU114 samples (four complete, e.g., Figure 4) exhibit characteristic traits of New World species, such as a shorter seed attachment and wider appearance, and thus we consider them to be native rather than introduced by Europeans. Grape was nearly ubiquitous in all shell piles except for 13NW. Pear is the only Old World fruit present in the assemblage. The eight identified seeds all derive from Shell Pile 2N, Level 2 (Bag #01-05).

Edible greens/seeds, many with economic and/or medicinal uses, were also identified in the 8GU114 assemblage. These include American bur-reed cf. (*Sparganium americanum*), bedstraw (*Galium aparine*), cane (*Arudinaria* sp.), legume family (Fabaceae), lotus (*Nelumbo* sp.), pine cone and pitch (*Pinus* sp.), pokeweed (*Sida* sp.), sedge (*Carex* sp.), spurge (*Euphorbia* sp.), and yaupon holly (*Ilex vomitoria*). Several small fragments of plant material could not be identified to the family level and were thus classified as unidentified or unidentifiable (see Tables 1 and 2). Unidentifiable plant remains had the highest density value for the miscellaneous category at 8GU114, followed by unidentified, lotus, and pine cone/pitch. Lotus root is recorded in Comanche ethnohistoric records as a food source (Mitchell 2016). The seed was found in 8GU114 samples, but the root is highly unlikely to preserve via carbonization as it was typically consumed or would have fully combusted due to its starch content. Bedstraw, pokeweed, and yaupon holly have been used as medicinal resources among Native peoples of Southeastern North America. The Cherokee used bedstraw as a laxative, diuretic, love medicine, kidney aid, venereal aid, and for various other medicinal purposes (Moerman 1986). Fritz (1989) argues that bedstraw was also likely used in food and/or beverages based on its common inclusion in archaeobotanical assemblages of edible seeds. Pokeweed was primarily used by Native peoples of the southeast to treat chronic conditions, with different portions of the plant

used to remedy specific ailments. The Cherokee used the berries for arthritis and rheumatism, the greens as a laxative and externally for ulcers and sores, and an infusion made from the root for eczema and fevers (Moerman 1998). The Seminole also used the berries as an analgesic (Moerman 1998). Parched yaupon holly leaves were boiled by Native peoples throughout the Southeast to prepare a decoction known as black drink. Black drink is often described in ethnohistoric records as having been consumed by men as a ritually-charged emetic, typically out of marine shell cups (Hudson 2004). Overviewing black drink consumption throughout the Southeast, Hudson (2004) notes that evidence for the practice is notably absent along parts of the Gulf coast but this omission is likely due to lack of data and not lack of engagement in this practice. 8GU114 is securely within the native range of yaupon holly, which stretches from Virginia to Texas (USDA PLANTS Database 2019). The finding of yaupon holly seeds in 8GU114 samples supports the argument that Native peoples of northwestern Florida engaged in black drink production during the Lamar phase.

Spatial & Stratigraphic Analysis

To examine plant composition by shell pile, data for waterscreened samples were removed and then comparative metrics of density, standardized count, and relative percent were calculated at the shell pile level (e.g., density = count/total soil volume for samples in target shell pile). Results are reported in Tables 3 and 4. General observations and stratigraphic patterning by shell pile are discussed below. Unidentifiable plant remains, ubiquitous at the 8GU114 site, are used as a comparative measure of fragmentation between shell piles and levels within each pile.

2N Plant remains from Shell Pile 2N derive from one stratum, Level 2. Shell Pile 2N has the lowest density of unidentifiable remains when compared to each pile. It is primarily composed of wax myrtle (30.38%), grape (12.66%), unidentifiable plant remains (13.92%), and unidentifiable seeds (11.39%). 2N also includes the only pear seeds in the 8GU114 assemblage. Fruits constitute most of the plants identified in 2N samples.

2C Shell Pile 2C is composed of two strata, Levels 1 and 2. The assemblage is primarily composed of unidentifiable plant remains (70.17%), wax myrtle (9.36%), walnut family (5.85%), hickory (4.09%), and lotus (3.22%). The high representation of unidentifiable plant remains by all comparative measures indicates that 2C has a high level of fragmentation. When results are broken down according to level, unidentifiable plant remains continues to represent the dominant category though there are subtle differences in the content of the two levels. Level 1 has the only instance of lotus in the 8GU114 assemblage and a lower number of identified taxa than Level 2. Nuts are the most abundant identified taxa and this stratum also contains the only securely identified maize kernel in the 8GU114 assemblage.

2S Shell Pile 2S is also composed of two strata, Levels 1 and 2. This pile is primarily composed of unidentifiable plant remains (49.45%), wax myrtle (28.57%), acorn (5.49%), and unidentified plant remains (4.39%). Level 1 and 2 principly vary in the ratios of wax myrtle to unidentifiable remains; Level 1 has a higher representation of wax myrtle than unidentifiable plant remains, while the opposite is true for Level 2. This pattern potentially indicates more fragmentation in Level 2, perhaps due to different taphonomic factors.

3 Shell Pile 3 consists of one level and is primarily composed of unidentifiable plant remains (81.63%), followed by wax myrtle cf. (7.14%), corn cupule cf. (4.08%), and unidentified plant remains (3.06%). This pile contained all the tentatively identified (cf.) corn in the site assemblage. It is highly fragmented, limiting the possibility of identification for many specimens.

13NW Shell Pile 13NW was sampled from a fallen tree with upended roots full of deep soil that was collected and floated. While primarily composed of unidentifiable plant remains (89.67%), the flotation sample from this context contained the only specimens of yaupon holly in the site assemblage. It also yielded bedstraw and wax myrtle, plants with medicinal uses. This pile appears to be primarily composed of plants with special, non-food uses, with hickory (cf.) and wax myrtle representing the only food plants.

Overall All shell piles contain remains of food plants and unidentifiable fragments. Grape is present in all shell piles except 13NW, a context which has potential for a complex taphonomic history. Corn was identified in samples from shell piles 2C and 3. Nuts are only found in 2C and 2S, with one tentatively identified specimen from 13NW.

Seasonality

Analysis of seasonality of occupation was conducted for the 8GU114 assemblage based on the wide variety of identified taxa (Figure 5). All identified taxa are harvestable at some point between the months of August to November, suggesting a fall occupation. Except for maize, all remaining food plants are gathered wild foods. It is interesting that relatively few food plants date to the spring and early summer months. It appears likely that either 8GU114 occupants (1) supplemented their diets with terrestrial or marine animal resources or (2) did not occupy the site during the spring and early summer. If the latter explanation could be defended, it would reinforce the hypothesis, suggested by low cupule counts, that maize was not processed on site. Trade and outfield processing are two possible explanations for this pattern.

Inter-Site Comparisons

Comparisons between the 8GU114 and 8LI2 assemblages are currently not possible due to low plant recovery from 8LI2 samples. However, it is important to note that one identifiable hickory specimen was recovered from 8LI2 flotation samples, suggesting that poor preservation does not render future macrobotanical investigations useless. Instead, the surprisingly broad list of taxa recovered from 8GU114 samples provides an impetus for greater sampling of 8LI2. Future research comparing the 8GU114 and 8LI2 assemblages would offer great potential for understanding whether maize is also present in small amounts at 8LI2 and the importance of medicinal plants in domestic assemblages from northwestern Florida, among other questions.

Conclusions

Flotation and waterscreened samples from the 8GU114 and 8LI2 sites yielded a wide array of food and non-food plants. Results lay the foundation for future botanical investigations in northwestern Florida. 8GU114 samples provide the earliest evidence of maize in the region, but the low counts and relatively small number of cupules suggest that this maize was either brought in via trade or processed in outfields. The identification of medicinal plants, including bedstraw, wax myrtle, pokeweed, and yaupon holly pose interesting questions regarding the functions of this site and the role of medicinal plants in Lamar phase domestic assemblages. Seasonality data for

8GU114 suggest that the site was primarily inhabited between August and November. Greater sampling of 8LI2 contexts would offer potential for inter-site comparisons that would help to contextualize the typical/unusual nature of findings at 8GU114 with respect to other settlements in the region.

Table 1. Summary Data for Macrobotanical Remains from 8GU114.

Waterscreened Samples		5	
Flotation Samples		17	
Volume/Flotation Sample (L)		9	
Total Soil Volume (L)		153	
Plant Weight (g)		42.4	
Wood Weight (g)		73.85	
Common Name	Scientific Name	Count	Weight (g)
Cultigens			
Corn kernel	*Zea mays*	2	--
Corn cupule cf.	*Zea mays*	4	--
Corn kernel cf.	*Zea mays*	1	0.01
Nuts			
Acorn	*Quercus* sp.	13	0.04
Acorn cap	*Quercus* sp.	1	--
Acorn cf.	*Quercus* sp.	1	--
Hickory	*Carya* sp.	16	0.08
Hickory cf.	*Carya* sp.	4	0.03
Walnut	*Juglans nigra*	1	--
Walnut cf.	*Juglans nigra*	2	0.02
Walnut family	Juglandaceae	20	0.15
Walnut family nutmeat	Juglandaceae	1	0.01
Walnut family cf.	Juglandaceae	1	--
Fleshy Fruits			
Grape	*Vitis* sp.	23	0.13
Grape cf.	*Vitis* sp.	2	0.01
Hackberry	*Celtis* sp.	8	0.01
Hackberry cf.	*Celtis* sp.	1	--
Pear	*Pyrus* sp.	8	0.16
Wax myrtle	*Myrica* sp.	111	0.23
Wax myrtle cf.	*Myrica* sp.	10	--
Persimmon	*Diospyros virginiana*	2	0.05
Miscellaneous			
American bur-reed cf.	*Sparganium americanum*	1	--
Bedstraw	*Galium aparine*	6	--
Cane	*Arudinaria* sp.	1	1
Legume family	Fabaceae	1	--
Lotus	*Nelumbo* sp.	11	0.02
Pine cone	*Pinus* sp.	3	--
Pitch	*Pinus* sp.	3	0.36
Pokeweed	*Sida* sp.	8	0.08
Sedge	*Carex* sp.	2	--
Spurge	*Euphorbia* sp.	4	0.04
Yaupon Holly	*Ilex vomitoria*	2	--
Unidentified	--	12	0.10
Unidentified seed coat	--	1	--
Unidentifiable seed	--	10	0.10
Unidentifiable[a]	--	586	3.71

[a]One unidentifiable fragment (0.14g) was the only plant remain found in waterscreened samples.

Table 2. Summary Data for Macrobotanical Remains from 8LI2.

Waterscreened Samples			5
Flotation Samples			4
Volume/Flotation Sample (L)			9
Total Soil Volume (L)			36
Plant Weight (g)			2.61
Wood Weight (g)			0.98
Common Name	Scientific Name	Count	Weight (g)
Nuts			
Hickory	*Carya* sp.	1	--
Miscellaneous			
Unidentifiable[a]	--	7	0.04

[a]One unidentifiable fragment (0.03g) was the only plant remain found in waterscreened samples.

Table 3. Comparative Measures of Plant Representation by Shell Pile, Pile 2, 8GU114.

	2N			2C			2S		
Common Name	Density	Standardized Count	Relative Percent (%)	Density	Standardized Count	Relative Percent (%)	Density	Standardized Count	Relative Percent (%)
Cultigens									
Corn kernel				0.22	0.28	0.58			
Corn cupule cf.									
Corn kernel cf.									
Nuts									
Acorn				0.33	0.42	0.88	1.11	0.52	5.49
Acorn cap							0.11	0.05	0.55
Acorn cf.							0.11	0.05	0.55
Hickory				1.55	1.97	4.09	0.22	0.10	1.10
Hickory cf.									
Walnut							0.11	0.05	0.55
Walnut cf.				0.22	0.28	0.58			
Walnut family				2.22	2.82	5.85			
Walnut family nutmeat				0.11	0.14	0.29			
Walnut family cf.				0.11	0.14	0.29			
Fleshy Fruits									
Grape	1.11	7.69	12.66	0.89	1.13	2.34	0.44	0.21	2.20
Grape cf.	0.11	0.77	1.26				0.11	0.05	0.55
Hackberry	0.89	6.15	10.13						
Hackberry cf.									
Pear	0.89	6.15	10.13						
Wax myrtle	2.67	18.46	30.38	3.55	4.51	9.36	5.78	2.69	28.57
Wax myrtle cf.									
Persimmon							0.22	0.10	1.10
Miscellaneous									
American bur-reed cf.				0.11	0.14	0.29			
Bedstraw							0.22	0.10	1.10
Cane							0.11	0.05	0.55
Legume family							0.11	0.05	0.55
Lotus				1.22	1.55	3.22			
Pine cone				0.33	0.42	0.88			
Pitch							0.33	0.15	1.65
Pokeweed	0.89	6.15	10.13						
Sedge							0.22	0.10	1.10
Spurge				0.44	0.56	1.17			
Yaupon Holly									
Unidentified							0.89	0.41	4.39
Unidentified seed coat							0.11	0.05	0.55
Unidentifiable seed	1.00	6.92	11.39						
Unidentifiable	1.22	8.46	13.92	26.67	33.80	70.17	10.00	4.66	49.45

Table 4. Comparative Measures of Plant Representation by Shell Pile, Piles 3 & 13NW, 8GU114.

	3			13NW		
Common Name	Density	Standardized Count	Relative Percent (%)	Density	Standardized Count	Relative Percent (%)
Cultigens						
Corn kernel						
Corn cupule cf.	0.44	1.34	4.08			
Corn kernel cf.	0.11	0.33	1.02			
Nuts						
Acorn						
Acorn cap						
Acorn cf.						
Hickory						
Hickory cf.				0.44	0.53	2.17
Walnut						
Walnut cf.						
Walnut family						
Walnut family nutmeat						
Walnut family cf.						
Fleshy Fruits						
Grape	0.11	0.33	1.02			
Grape cf.						
Hackberry						
Hackberry cf.	0.11	0.33	1.02			
Pear						
Wax myrtle				0.33	0.40	1.63
Wax myrtle cf.	0.78	2.35	7.14	0.33	0.40	1.63
Persimmon						
Miscellaneous						
American bur-reed cf.						
Bedstraw	0.11	0.33	1.02	0.33	0.40	1.63
Cane						
Legume family						
Lotus						
Pine cone						
Pitch						
Pokeweed						
Sedge						
Spurge						
Yaupon Holly				0.22	0.27	1.09
Unidentified	0.33	1.01	3.06	0.33	0.40	1.63
Unidentified seed coat						
Unidentifiable seed				0.11	0.13	0.54
Unidentifiable	8.89	26.84	81.63	18.33	22.06	89.67

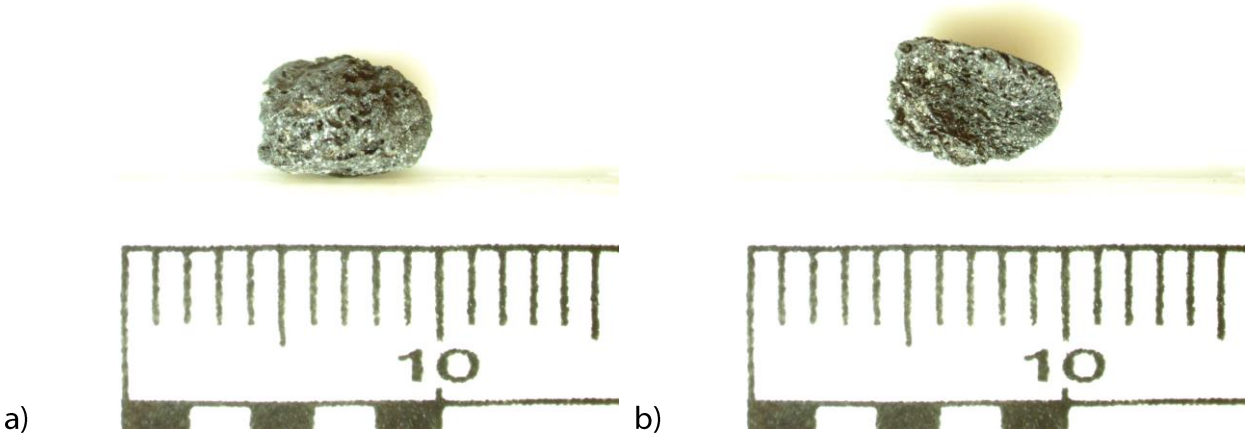

Figure 1. Maize kernel (a-b), Bag # 02-14, Shell Pile 2C, 8GU114. Scale bar unit = 1 mm.

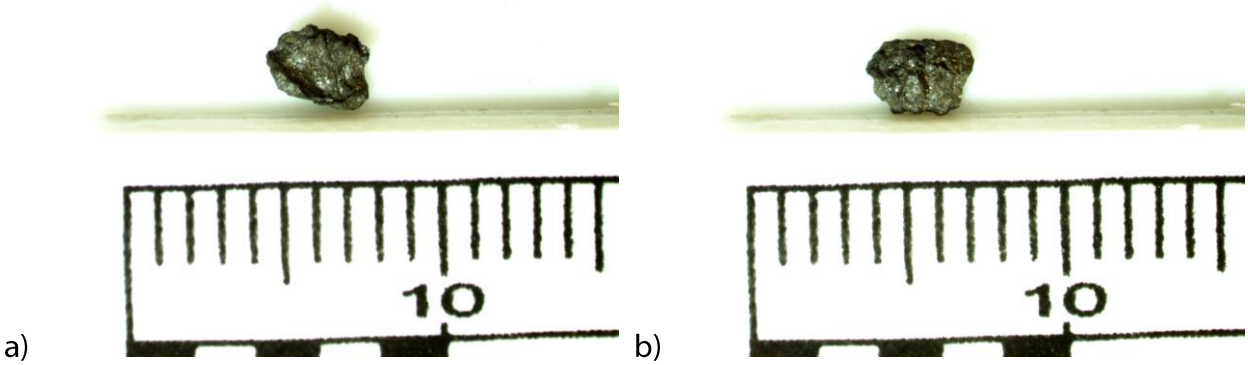

Figure 2. Maize cupule cf. (a-b), Bag # 1-102, Shell Pile 3, 8GU114. Scale bar unit = 1 mm.

Figure 3. Wax myrtle, Bag # 01-44, Shell Pile 2S, 8GU114. Scale bar unit = 1 mm.

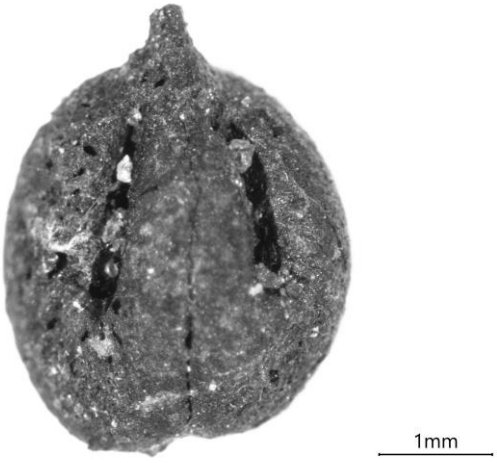

Figure 4. Grape seed, Bag #01-44, Shell Pile 2S, 8GU114.

Figure 5. Seasonality of plants identified in 8GU114 samples.[a]

[a] Cane, pine pitch, spurge, and bean family excluded due to potential for year-round availability. Seasonality data derived from Scarry 2003 and VanDerwarker and Stanyard 2009.

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