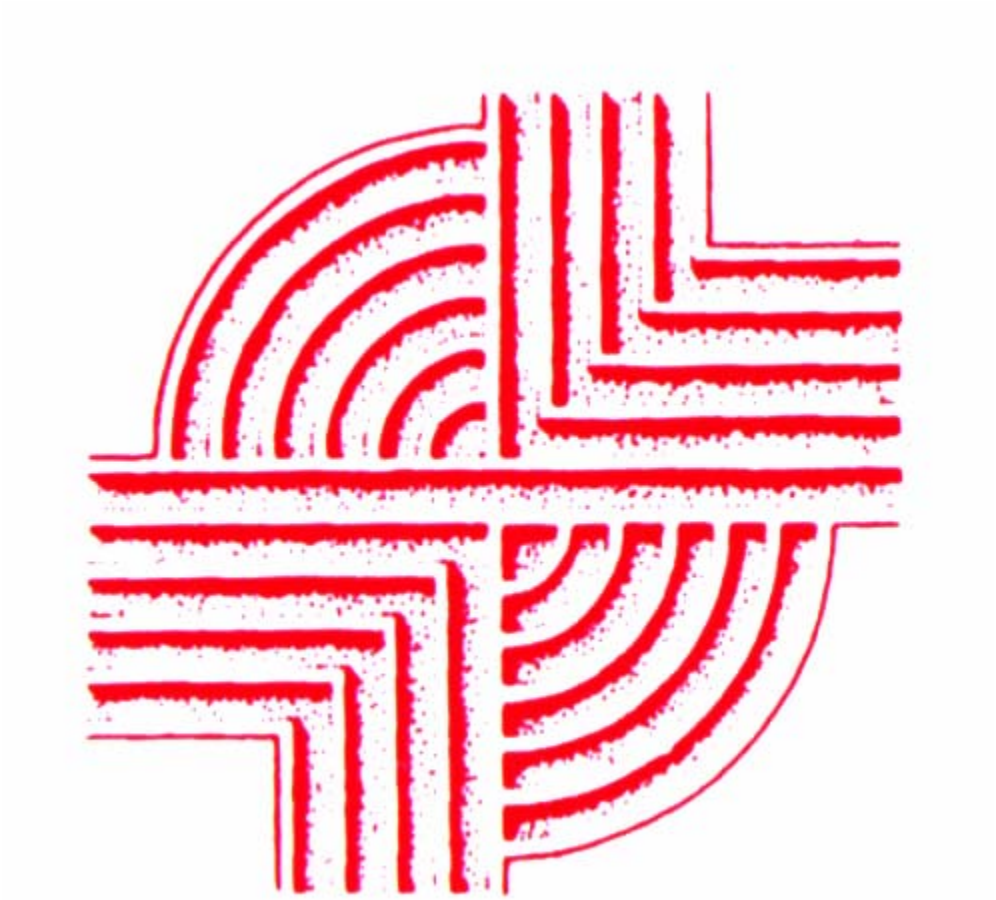
ETHNOBOTANICAL ANALYSIS OF SAMPLES FROM 22OK904, 22OK905, AND 22OK977



CHICORA RESEARCH CONTRIBUTION 414

ANALYSIS OF ETHNOBOTANICAL SAMPLES FROM 22OK904, 22OK905, AND 220K977

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CHICORA RESEARCH CONTRIBUTION 414

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ABSTRACT

This study reports on the examination of a sample of charred plant remains from three sites identified as small farmsteads in Oktibbeha County, east central Mississippi. From 22OK904 there are 86 proveniences (168 bags) reflecting eight features, four burials, and 24 units. From 22OK905 there are 21 proveniences (43 bags) from five features and four postholes. From 22OK977 there are 38 proveniences (85 bags) from eight features and 17 units.

The collection has produced variable amounts of wood charcoal from the features, often intermixed with abundant uncarbonized organics. Also present are small quantities of charred and calcined bone, shell fragments, a microflake, and a sparse quantity of plant food remains. These include primarily hickory nutshell, a few examples of acorn shell, and a small assemblage of corn. The corn is consistent with other samples from Mississippi, appearing to be Northern Flint.

Identified seeds that may have cultural implications include holly or yaupon (*Ilex* sp.), amaranths (*Amaranthus* sp.), and persimmon (*Diospyros virginiana*). Other seeds, such as skullcap (*Scutellaria* sp.) and mullein (*Verbascum* sp.) are more than likely weedy species attracted to the disturbed habitat of the farmstead.

The low incidence of cultigens, especially corn, may be the result of unrecognized sampling biases, or may have yet to be fully understood cultural implications. There is a vague suggestion that the low incidence of corn may be related to both methods of preparation and also the failure to have corn cob pits on small farmsteads.

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INTRODUCTION

Background

The materials examined in this study were provided by Dr. Janet Rafferty and Dr. Homes Hogue of the Cobb Institute of Archaeology at Mississippi State University. The materials, all flotation samples, are from three sites in Oktibbeha County, Mississippi (Figure 1). A total of 86 proveniences (168 bags) were provided from 22OK904, 21 proveniences (43 bags) from 22OK905, and 38 proveniences (85 bags) from 22OK977. These generally represented both light and heavy fractions from water flotation with volumes varying from 100% of the feature to standardized 2 l samples from the 2x2 m units. All of the proveniences were designed either as post holes, features (broken into stratigraphic zones), or samples from excavation units (where samples were taken from the plowzone as Zone A, the top 10 cm of the underlying soil as Zone B, and the remainder as Zone B2).

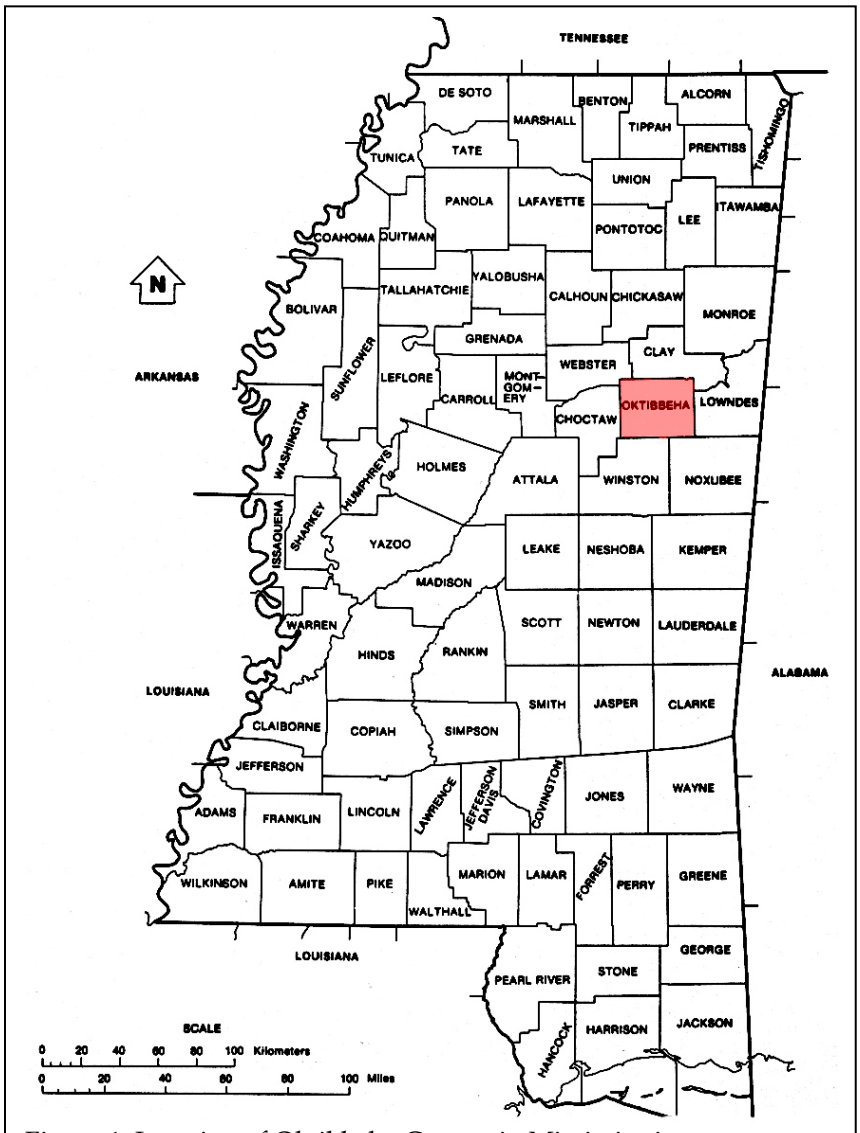

Figure 1. Location of Oktibbeha County in Mississippi.

The sites are characterized as relatively short-term sedentary, year-round occupations, based on the amount of pottery, the presence of human burials, and evidence of structures (Janet Rafferty, personal communication 2004). The sites date from the Early Mississippian to Protohistoric. The investigations are the result of recent highway construction around the town of Starkville and this research has been graciously funded by the Mississippi Department of Transportation.

Research reveals that corn was abundant at the sites, based on carbon isotope studies of dog bones, rodent bones, and coprolites (Homes Hogue, personal communication 2004).

Consequently, one primary concern was to determine the abundance of corn in the flotation samples from the sites.

Samples

Although the associated archaeological report for these sites should be consulted for detailed information on the various proveniences, this section will provide some very general information that may assist in the interpretation of the results. Some of the features are described as "large, midden-filled pits . . . often cut down into the chalky C horizon" that are 30 to 40 cm in depth, roughly circular, and flat-bottomed. They may range in size from 1.2 to 2 m in diameter (Peacock et al. n.d.:1).

22OK904

Feature 1 is a highly stratified, midden filled pit that evidenced abundant artifacts dating from about AD 1500 to 1650. The feature was excavated in six zones, as well as some mixed proveniences (such as wall and floor cleaning).

Feature 2 intruded into the top of Feature 1.

Feature 3 is a human burial (Burial 4) pit that also partially intruded into Feature 1.

Feature 4 is a dog burial that also intruded into Feature 1. The researchers not that the charcoal from this provenience likely came from Feature 1.

Feature 5 is the equivalent of Feature 1, Zone 4, consisting of a burned ashy area within Feature 1 at its middle bottom. We have kept the two proveniences separate for this analysis.

Features 8 and 9 were identified after site stripping.

Feature 10 was divided into two zones.

Feature 11 was also identified after site stripping.

Features 8-11 are all small, circular basins with no obvious function.

Burials 1-5 all represent human burials across the site. As previously mentioned Burial 4 intruded into Feature 1, as did Burial 2.

Four post holes are present in the assemblage, although one, Post Hole 4, is likely a shovel test from the original site survey.

22OK905

Feature 3, 4, and 5 are all very similar, representing shallow, circular, pits filled with midden. Features 3 and 4 also contained thin clay lenses at their bases, suggestive of open pits that collected water. Peacock and his colleagues suggest these pits were perhaps storage or clay extraction pits for daub or pottery – being used for trash disposal afterwards (Peacock et al. n.d.:2). These pits are also thought to fall within the AD 1500-1650 time frame.

Features 2 and 6 are described as being rather non-descript small basins with no obvious function.

Also present from this site are four postholes, all identified after site stripping.

22OK977

The assemblage from this site includes eight pits, Features 6–13, all consistent in terms of form and apparent function with those from the other sites. Features 6-8 and 13 evidenced multiple zones. Also sampled were five postholes and a large number of units. As previously mentioned, for the unit excavations Zone A represents the plowzone – these materials can generally be dismissed as heavily impacted by modern agricultural activities. The underlying Zones B and, where present B2, may provide generalized information on the site's ethnobotanical remains.

Extant Environmental Conditions

Situated in the east central part of Mississippi, Oktibbeha County spans four topographic areas -- the North Central Hills, the Flatwoods, the Pontotoc Ridge, and the Black Prairies. The Black Prairie Belt developed from Upper Cretaceous chalks and the portion adjacent to the Tombigbee River is primarily composed of ferruginous red sandy hills of the Eutaw Formation. The Pontotoc Hills form a belt about 5 miles in width between the Flatwoods to the west and the Black Prairie Belt to the east. This belt is composed primarily of Ripley sands and clays, with some chalk. The hills rise gently 50 to 60 feet above the valleys on the western side but are steeper to the east where the valleys are narrower. The Flatwoods, a gently undulating plain, has developed on the calcareous and micaceous Porters Creek clay. The is situated in this region, which has also been traditionally viewed as a rather dissected portion of the Gulf Central Plain called the clay hills. Soils have been classified as primarily Susquehanna-Savannah-Ruston series, although there is tremendous local variation (U.S. Department of Agriculture 1939:1072).

The investigated sites are identified from the Black Prairie area where the rolling uplands "are literally blanketed" with small Late Mississippian to Protohistoric farmsteads and hamlets (Peacock et al. n.d.:1).

The climate is warm and humid, influenced by the subtropical latitude, the high land mass to the north, and the warm waters of the Gulf of Mexico to the south. Temperatures today range from an average of about 46° F in the winter to an average of about 81°F in the summer. As might be expected for the southern subtropics, the relative humidity for the region is high during both the winter and summer. Rainfall averages about 50 inches, with about 23 inches occurring in the April through September growing season. The average growing season is about 226 days.

While it is very difficult in many cases to project current environmental conditions back to even the Mississippian Period, both the soils and climate of the project area are significant features when considering the success of aboriginal cultivation. Trawick Ward (1965:42-43) offers a brief synopsis of various soils and their effect on prehistoric cultivation, noting that most Mississippian sites are found associated with silt loams (as opposed to either clay or sand soils) because the tilth of these soils is easily maintained and they are relatively fertile. An even greater limiting factor is rainfall. Corn requires at least 20 inches of rainfall, which must be well distributed throughout the growing season (Wann 1977:183). Although the site area may be expected to produce a good corn yield, it holds the potential for greatly reduced yields and even crop failure.[1]

Braun (1950) classifies the region as part of the Gulf Slope section of her Oak-Pine Forest, although she observes that there is considerable diversity on a local level (Braun 1950:271-272). For example, the Black Prairies region was originally characterized by treeless areas occupied by prairie vegetation. Oaks were found on the higher reddish soils which "dot the prairie surface like islands" (Braun 1950:277) and the stream bottoms were dominated by dense hardwood forests. In contrast, the Flatwoods tended to be dominated by loblolly pines and post oaks. In the site vicinity, however, Braun identifies a broad band of pine associated mostly with upland oaks and hickories (Braun 1950:277).

Wenger (1968) discusses the silvics of a pine-hardwood forest and notes that pine is usually eliminated within 300 years of the beginning of the successional process, although the trend toward hardwood climax is slower on light sandy soils than on clay soils. Further, a pine forest may be artificially maintained. Regardless, it seems likely that there would be considerable diversity in species readily available to the Mississippian people.

[1] The driest year recorded was 1952 when only 31 inches of rain fell, greatly reducing corn and other agricultural yields.

In general these sites are situated in areas of considerable variety – nearby lowland creek ecotones providing more mesic vegetation and uplands dominated by pine, oak, and hickory.

METHODS

There are a range of significant biases which potentially affect the collection and interpretation of ethnobotanical collections (see, for example, Figure 4.1 in Popper 1988). It is important to remind the reader that what is discarded, what is preserved, and what is identified all affect our interpretation of ethnobotanical samples.

The materials from 22OK904, 905, and 977represent a number of different features. In each case virtually all of the feature fill was subjected to mechanical water flotation – so we have the rare potential to view a nearly 100% sample.

In spite of this there is incredible variation in the quantity of carbonized remains present – for example, while Feature 1 at 22OK904 produced nearly 164 g of charcoal, Features 2, 3, 4, 8, 9, and 10 from the same site all yielded less than 5 g and only one of the four burials yielded more than 1 g of charcoal.

At 22OK905 Features 5 and 6 produced relatively abundant ethnobotanical remains, while Features 2-4 exhibited very poor yields.

Similar variation is seen at 22OK977 where only Features 7 and 10 yielded more than 5 g of carbonized material.

While we have significant differences in yields, we have no reason to believe that there is any significant issue with the field methodology and it seems reasonable to associate the differences with either differences in feature function or the preservation context.

All of the samples were provided in a semi-cleaned state. That is, the quantity of both sand and uncarbonized organic material appears to have been significantly reduced in many samples by pre-sorting. As a result, there was relatively little "trash" in many of the samples.

For example, at 22OK905 all of the samples contained less than 23% trash. At 22OK977 there was considerably more variation and several of the samples were largely trash – with upwards of 75-90% of the sample being uncarbonized debris. At 22OK904 Feature 1 was a very clean feature, while several others (notably Features 8 and 9, and Burial 3) were almost exclusively noncarbonized organics.

All of the feature and burial samples were prepared in a manner similar to that described by Yarnell (1974:113-114) and were examined under low magnification (7 to 30x) to identify carbonized plant foods and food remains. Remains were identified on the basis of gross morphological features and seed identification relied on U.S.D.A. (1948, 1971), Martin and Barkley (1961), and Montgomery (1977). Wood identification was generally not conducted given the small size of the fragments involved (making it difficult or impossible to expose a fresh transverse surface), but where conducted was taken to the genus level using comparative samples, Panshin and de Zeeuw (1970), and Koehler (1917).

In contrast, the unit and posthole samples were so small that they were not prescreened. Rather they were hand sorted to remove the organic debris, daub, and other non-ethnobotanical remains. The resulting material was then examined under low magnification (7x to 30x).

RESULTS

22OK904

Feature 1 is certainly the largest of all the samples, containing 163.64 g of charcoal (not including Feature 5 which could legitimately be included). There is little question that a sample of this size would generally be considered highly reliable.

The feature is dominated by wood charcoal (which accounts for 59.48% of the total sample weight). The proportion of wood charcoal in the individual zones varies from a low of 36.36% in Zone 5 to a high of 69.98 in Zone 1. Uncarbonized material is relatively insignificant in all zones (with an overall of 7.56%) except Zone 5, where it accounts for 18.18%. Small bone is present throughout the feature, but is most noticeable in Zone 3, where is accounted for a fifth of the sample (20.95%). Shell was found only in Zone 1 – these samples were exclusively small, thin fragments possibly representing riverine mollusk.

Hickory nutshell is the most common plant food remain in the feature, accounting for nearly a quarter of the total weight (40.53 g and 24.77%). It varies from a high in Zone 5 (where it accounts for 45.76% of the collection) to a low in Zone 1 (where it represents only 8.67%).

In contrast acorn accounts for only 5.68% of the total collection from Feature 1 and is relatively uncommon in most zones. It is most common in Zone 1 (where hickory was relatively uncommon) where it accounts for 14.16% of the zone weight.

Corn is found in only two proveniences within Feature 1 – Zones 1 and 2 mixed and Zone 3. In Zone 3 it accounts for 3.38%, although overall it accounts for a very low proportion – only 0.06%. While most of the specimens were fragmentary cupules, the sample did produce one carbonized kernel. This specimen exhibited no denting and measured 4.52 mm in height and 6 x 4.23 mm.

The only seed found in the sample was unidentifiable, probably representing a weedy grass species).

Feature 2 is not dramatically different from Feature 1, although wood charcoal is far more abundant (accounting for 82.43% of the total). A small quantity of bone is present and hickory is the most significant food remain – accounting for 13.51%. Acorn is relatively uncommon (1.35%) and corn is absent.

Feature 3 is also dominated by wood (58.41%) although bone is much more common (22.93%). Hickory is present, but not abundant (12.74%) and acorn is absent, as is corn. The sample did yield one seed, a carbonized specimen of *Ilex* sp.

Ilex are trees or shrubs of which probably the most common is the holly (*Ilex opaca*), although the best known in association with Mississippian sites is *Ilex vomitoria* or the yaupon holly used in the "black drink." The plants fruit from September through November, although they may persist into the next year (Radford 1968:681). While attractive to, and spread by, birds this specimen is carbonized so probably has a cultural origin.

Feature 4 is very similar in proportions to Feature 1, exhibiting small quantities of corn and acorn nutshell, although hickory is far more common (18.22%).

Feature 5, which could be incorporated with Zone 4 of Feature 1, is dominated by wood

Table 1.
Flotation Samples from Features and Burials at 22OK904, weight in g

	Wood Charcoal		Uncarb. Organic		Bone		Shell		Hickory Nutshell		Acorn Nutshell		Corn		Seeds		Total	Seeds
Feature & Provenience	Wt.	%	Wt.	%	Wt.	%	Wt.	%	Wt.	%	Wt.	%	Wt.	%	Wt.	%		
Fea. 1, Zone1	39.48	69.98	2.84	5.03	1.18	2.09	0.04	0.07	4.89	8.67	7.99	14.16					56.42	
Fea. 1, Zone 2	32.55	60.97	5.90	11.05	0.21	0.39			14.42	27.01	0.30	0.56			0.01	0.02	53.39	1 unidentifiable
Fea. 1, Zone 1 & 2 mixed	2.64	49.90	0.42	7.90					1.44	27.23	0.06	1.04	0.02	0.42			4.58	
Fea. 1, Zone 3	1.30	50.00	0.18	6.76	0.54	20.95			0.44	16.89	0.05	2.03	0.09	3.38			2.60	
Fea. 1, Zone 4	3.76	55.62	0.41	6.06	0.63	9.32			1.84	27.22	0.12	1.78					6.76	
Fea. 1, Zone 5	0.50	36.36	0.25	18.18					0.59	42.42	0.04	3.03					1.38	
Fea. 1, Zone 6	13.39	42.86	2.08	6.65	1.22	3.89			14.29	45.76	0.27	0.85					31.25	
Fea. 1, cleaning	3.71	51.04	0.27	3.70	0.20	2.77			2.62	36.03	0.47	6.47					7.27	
Fea. 1, Total	97.33	59.48	12.35	7.56	3.98	2.43	0.04	0.02	40.53	24.77	9.30	5.68	0.11	0.06			163.64	
Fea. 2	0.61	82.43	0.01	1.35	0.01	1.35			0.10	13.51	0.01	1.35					0.74	
Fea. 3, Zone A	1.52	55.41	0.25	8.92	0.63	22.93			0.35	12.74					0.01	t	2.76	1 *Ilex* sp.
Fea. 4	3.70	74.81	0.17	3.49	0.12	2.33			0.90	18.22	0.04	0.78	0.02	0.39			4.95	
Fea. 5 (=Fea. 1, Zone 4)	1.82	88.37	0.05	2.33							0.03	1.55			0.16	7.75	2.06	1 *Diospyros virginiana*
Fea. 8	0.01	1.54	0.64	98.46													0.65	
Fea. 9			0.96	100.00													0.96	
Fea. 10A	0.76	27.63	0.73	26.55	1.01	36.73			0.25	9.09							2.75	
Fea. 10B	0.33	59.09	0.18	31.82									0.05	9.09			0.56	
Burial 1	0.03	100.00															0.03	
Burial 2			0.31	48.44	0.12	18.75			0.16	25.00	0.05	7.81					0.64	
Burial 3	0.08	19.05	0.34	80.95													0.42	
Burial 5	0.60	22.31	1.34	49.81	0.08	2.97			0.60	22.31			0.07	2.60			2.69	

Table 2.
Ubiquity of Selected Plant Materials from 22OK904 Flotation Samples

Material	No. of Occurrences	Percent Ubiquity
Hickory nutshell	14	70.0
Acorn nutshell	12	60.0
Corn	5	25.0
Ilex sp.	1	5.0
Diospyros virginiana	1	5.0

charcoal and contains no hickory (in contrast, 27.22% of Zone 4 in Feature 1 is hickory).Consequently, it appears that this ash pocket represents a distinct cultural activity.

Present in the collection is one carbonized *Diospyros virginiana* or persimmon seed. The persimmon is a deciduous tree that is commonly found in dry forests, pinelands, and old fields. The fruit, about 4 cm in diameter is hard and astringent when green, pulpy and sweet when ripe, with fruiting generally from September through October. The persimmon is a wild plant food found not infrequently at Native American and historic sites.

Table 3.
22OK904 Unit Flotation Samples, weight in g

Provenience	Wood Charcoal	Hickory Nutshell	Debris	Seeds
16S 4W, Zone A	2.44	0.02	0.01	
16S 5E, Zone A			0.20	
4S 0E, Zone A	0.01		0.17	
				0.02 - 2 *Scutellaria* sp. 0.01 -
4S 2E, Zone A	0.49		0.04	14 UID weed seeds
4S 4E, Zone A			0.81	
4S 6E, Zone A	0.01		0.08	
4S 8E, Zone A	0.04		0.31	
4S 10E, Zone A	0.01		0.27	
4S 10E, Zone B	0.28	0.02	0.02	
4S 12E, Zone A	t		0.32	0.01 - 1 *Verbascum* sp.
2S 11W, Zone A			0.17	
2S 4W, Zone A	0.02		3.10	
2S 2E, Zone A	0.06		5.11	0.01 - 2 *Verbascum* sp.
2S 4E, Zone A	0.05		t	0.05 - 1 *Ilex* sp.
2S 6E, Zone A	0.13	0.01	1.51	
2S 12E, Zone A	0.01		0.86	
2S 14E, Zone A	0.21	0.02	0.24	
0N 12E, Zone A	0.10		0.96	
0N 12E, Zone B	0.19	t	0.02	
0N 14E, Zone A	0.04		0.06	
4N 2E, Zone B	0.02	0.01		
12N 2E, Zone A	0.26		0.16	
14N 2E, Zone A	0.01		t	
20N 0E, Zone A	0.02		0.89	

Features 8 and 9 exhibit sparse collections dominated by trash – in both cased non carbonized remains and gravel.

Feature 10 does include a small amount of Corn, although wood charcoal and trash are by far the most common constituents.

The burials all exhibit small collections. Hickory is found in two of the collections, acorn in one, and corn in another. It seems safe to assume that the carbonized materials present in the burial fill came either from other features or from general sheet midden.

Table 2 illustrates the ubiquity index – that is, the number of samples in which a plant occurs – of the materials recovered from these features. While the data must be interpreted with caution, it probably results in the best measure

of relative importance presently available. What this table reveals is that hickory and acorn shells are the most significant food remains present at the site – and are far more common than the corn cultigen.

When weights are compared, hickory nut shell contributes 42.89 g while acorn contributes only 9.43 g, yielding a ratio of acorn to hickory of 1:4.5. Of course, the hickory shell is denser and heavier in weight, allowing better preservation than acorn shell (or corn, for that matter).

The unit samples from 22OK904 provide relatively little additional information (Table 3). Only three primary categories of remains are present – wood charcoal, hickory nutshell, or debris. Most (17 of 24 or 70.8%) are dominated by debris. The remainder are dominated by wood charcoal. Hickory nutshell is found in only six of the samples (representing a ubiquity index of 25% – far lower than found in the features).

The units did produce 20 seeds, although 14 are weedy grass seeds found in a single plowzone provenience. The remaining samples include one additional *Ilex* seed, three specimens of *Verbascum* sp. or mullein. This is an erect perennial or biennial generally found along roadsides, in pastures, and in waste places. Characteristic of disturbed habitats, all of the seeds are found plowzone contexts and, were they not carbonized, could easily be ignored as naturally intrusive. If they are indeed associated with the Native American activities they are suggestive of the kind of disturbed areas typical of a small farmstead or hamlet. The plant flowers and seeds from June through September.

Historically mullein had a number of medicinal uses, being recognized as a astringent, demulcent, a weak diuretic, anodyne, and antispasmodic (Morton 1974:156; see also PDR 1998:1210). From Europe, it became naturalized in the United States, although how early is uncertain (Millspaugh 1892:110-2).

Also present in the collection, again from a plowzone context, are two *Scutellaria* sp. seeds. *Scutellaria* or skullcap is a perennial herb that generally seeds from July through August and is found in pine barrens, savannahs, and low meadows – although varieties can also be found in mixed deciduous woodlands. While Millspaugh (1892:120) reported its medicinal value as uncertain, it is today recognized as a sedative, antispasmodic, and anti-inflammatory (PDR 1998:1128-1129).

22OK905

With one exception (Feature 6), the samples from 22OK905 consist of relatively abundant wood charcoal and moderately high amount of hickory nutshell. Wood ranges from a low of 37.5% in Feature 2, Zone 1 to a high of 95.1% from Zone 2 in that same feature. In Feature 3 wood charcoal ranges from about 50 to 91%, while in Feature 4 wood ranges from about 73 to 90%. Although there is more variation, hickory nutshell is present in five of the six features, with the proportion ranging from a low of less than 1% in Feature 3, Zone A to a high of 50% in Zone 1 of Feature 2.

Distinct from 22OK904, this site yielded only one feature that exhibits even a small trace of acorn nutshell. And only one pit – Feature 5 – produced any corn. That one sample yielded five corn cupules with widths ranging from 4.5 to 5.4 mm and suggestive of 2.7 to 3.4 per 10 mm.

The ubiquity of hickory nutshell is 69.2% – very similar to hickory nutshell ubiquity at 22OK904. Acorn ubiquity, however, is only 7.7% -- much lower than 22OK904 and corn ubiquity is also 7.7% – significantly lower than for 22OK904. Since features at the two sites are otherwise very similar according to the researchers, we suspect these differences are primarily the result of the much smaller sample from 22OK905.

Three proveniences (two features) produced seed fragments. Feature 3 yielded 25 non-carbonized seeds, 23 of them being *Physalis* sp. This is a ground cherry, an annual or perennial

Table 4.
Flotation Samples from Features at 22OK905, weight in g

Feature & Provenience	Wood Charcoal Wt.	%	Uncarb. Organic Wt.	%	Stone/Soil Wt.	%	Small Bone Wt.	%	Hickory Nutshell Wt.	%	Acorn Nutshell Wt.	%	Corn Wt.	%	Seeds Wt.	%	Total	Seeds
Fea. 2, Zone 1	0.03	37.50	0.01	12.50					0.04	50.00							0.08	
Fea. 2, Zone 3	0.39	95.10							0.02	4.90							0.41	
Fea. 3, Zone A, S 1/2	6.16	91.30	0.55	8.10					0.04	0.60	t	t			t	t	6.75	2 non-carbonized fragments
Fea. 3, Zone A, N 1/2	0.05	50.00	t	t					t	t					0.05	50.00	0.10	23 non-carbonized *Physalis* sp.; 1 *Amaranthus* sp.
Fea. 3, Zone B	0.61	69.30	0.20	22.70					0.07	8.00							0.88	
Fea. 4, Zones A & B, S 1/3	0.07	77.80	0.02	22.20													0.09	
Fea. 4, Zone A, N 2/3	0.20	90.90	0.01	4.50											0.01	4.50	0.22	2 non-carbonized fragments
Fea. 4, Zone B, S 1/3	0.06	75.00	0.01	12.50					0.01	12.50							0.08	
Fea. 4, Zone B, N 2/3	0.32	72.70	0.08	18.20					0.04	9.10							0.44	
Fea. 5, N 1/2	9.43	58.74					0.02	0.12	6.49	40.43			0.11	0.71			16.05	
Fea. 5, S 1/2	12.37	59.06	0.73	3.51					5.93	28.32			0.20	0.08			19.23	
Fea. 6, W 1/2	0.50	2.52			18.25	91.82	1.13	5.66									19.88	
Fea. 6, E 1/2	0.36	2.46			13.46	92.82	0.69	4.73									14.51	

herb that flowers in April and May and fruits in June and July. While found in woodlands, it is also common along roadsides and in fields. Since these specimens are not carbonized, it is likely that they represent weedy intrusions in the archaeological record and do not reflect aboriginal activity.

Table 5.
Posthole flotation samples from 22OK905, weight in g

Provenience	Wood Charcoal	Debris	Small Bone	Hickory Nutshell	Corn
PH 1, after stripping	0.32	0.03			0.01
PH 2, after stripping	0.45	0.08			
PH 3, after stripping	0.57	0.25	0.25	0.25	
PH 4, after stripping	5.42	0.17	0.69	1.64	0.01

Also found is a single *Amaranthus* sp. seed coat that was carbonized. Amaranth or pigweed is thought to have been encouraged by some groups, although it also occurs naturally as a sporadic weed in waste places. The plant seeds from June until the first frost. In addition to the seeds, the young leaves are also good sources of protein, minerals, β-carotene, and vitamin C (Vaughan and Geissler 1997:170).

Although there are no unit samples from 22OK905, the four postholes samples were so small that they were sorted without screening. The results are shown in Table 5. In each case wood charcoal is the most abundant material. Hickory nutshell, however, is found in two postholes, accounting for 18.9% of the materials in Posthole 3 and 20.7% of the material from Posthole 4.

Corn was found in two of the postholes, with Posthole 1 producing a single measurable cupule. Its width was 6.2 mm and the width suggests 3 per 10 mm.

22OK977

All of the eight features from this site contain wood charcoal, although many of the

Table 6.
Flotation Samples from 22OK977, weight in g

Feature & Provenience	Wood Charcoal Wt.	Wood Charcoal %	Uncarb. Organic Wt.	Uncarb. Organic %	Stone/Soil Wt.	Stone/Soil %	Hickory Nutshell Wt.	Hickory Nutshell %	Corn Wt.	Corn %	Total
Fea. 6, Zone 1	0.08	9.42	0.77	90.58							0.85
Fea. 6, Zone 2	0.21	61.76	0.12	35.29			0.01	2.94			0.34
Fea. 6 Total	0.29	24.37	0.89	74.79			0.01	0.84			1.19
Fea. 7, Zone 1	3.04	46.09			3.33	50.40	0.23	3.50			6.60
Fea. 7, Zone 2	0.04	50.00	0.01	16.67	0.02	33.33					0.07
Fea. 8, Zone 1	0.81	88.37	0.11	11.63							0.92
Fea. 8, Zone 2	0.15	21.57	0.55	78.43					t	t	0.70
Fea. 8, Zone 3	1.08	86.27	0.17	13.73							1.25
Fea. 9	0.55	14.24	1.07	27.48	2.07	53.31	0.19	4.97			3.88
Fea. 10, W 1/2	0.89	14.97	5.01	84.35			0.04	0.68			5.94
Fea. 11	0.11	35.29	0.15	47.06			0.05	17.65			0.31
Fea. 12	0.16	7.34	2.02	92.66							2.18
Fea. 13, Zone 1	2.00	65.94	0.97	31.88			0.07	2.17			3.04
Fea. 13, Zone 2	0.41	95.00	0.02	5.00							0.43
Fea. 13, Total	2.41	69.45	0.99	28.53			0.07	2.02			3.47

Table 7.
Unit flotation samples from 22OK977, weight in g

Provenience	Wood Charcoal	Hickory Nutshell	Micro flake	Debris
26S 112W, Zone A	0.02			0.55
8S 100W, Zone A	0.06			0.22
8S 100W, Zone B	0.89			0.40
8S 100W, Zone B2	0.43	0.01		0.34
8N 6E, Zone A	0.08			0.23
8N 6E, Zone B	0.05			0.24
8N 6E, Zone B2	t			0.18
8N 8E, Zone A	0.16			0.48
8N 8E, Zone B	0.09			0.44
8N 14E, Zone A	0.01		t	0.04
8N 14E, Zone B	0.29			0.82
10N 8E, Zone A	0.01			0.27
10N 8E, Zone B	0.08			0.18
10N 10E, Zone A	0.01			0.28
10N 10E, Zone B	0.01			0.03
10N 12E, Zone A	2.94	0.09		0.22
10N 12E, Zone B	0.05			0.20

proveniences also contained abundant trash. In fact half of the 13 proveniences are at least 50% uncarbonized organics or stone/soil. Only two of the eight feature samples weigh over 5 g. Therefore the features produced very small quantities of remains, calling into question their validity. Nevertheless, hickory nutshell was identified in six of the eight features and it has a ubiquity index of 46.1% - below that identified at the other two examined sites. Corn was found as a very small cupule fragment in only one of the feature proveniences – Feature 8, Zone 2.

The unit flotation samples (Table 7) provide relatively little data. In 14 of the 17 samples (82.3%) the debris are more abundant than the carbonized materials. Of the samples where the carbonized remains are more abundant, one is from a plowzone context, one is from Zone B, and the other is from Zone B2. The only food remains from any of the samples is hickory nutshell – found in both a Zone B2 and a plowzone context.

Discussion of Plant Food Remains

This study identified three virtually certain plant foods – hickory nuts, acorns, and corn. To that list we can reasonably add persimmon and perhaps (with less confidence given the low incidence) amaranth.

The use of both hickory nuts and acorns as a supplemental food source by Native Americans is well documented in virtually every portion of the Southeast. Hickories and oaks would have been relatively common in the site vicinity, as previously discussed, although agricultural clearing and second-growth succession (if present) would tend to limit hickory and encourage oak. The extent to which resident peoples would have actually destroyed a significant food resource is not known. Hickories tend to produce an abundant crop every one to five years, usually with light crops in the intervening years (Fowells 1965; Schopmeyer 1974). Crop yields range from about two to three bushels per tree in a good year (Schopmeyer 1974). Oak trees will produce a good crop every one to ten years, also with a highly variable yield (200 to 2,000 acorns per tree) (Fowells 1965).

The presence of these nut resources indicates that the residents at these three sites were in the area during the fall, as fruits ripened and fell to the ground; or perhaps the nuts were gathered then and stored for later use. The abundance of hickory and sparseness of acorn may be explained by local environmental conditions, active selection by the occupants, or even differential preservation.

Several researchers have described the complementary nutritional nature of hickory nuts and acorns (Asch et al. 1972; Caddell 1982: 34; Styles 1981:81); summary data are presented in Table 8. Hickory nuts, when compared to acorn,

Table 8.
Nutritional composition of selected Native American foods, per 100 g of edible portion (source: USDA)

	food energy kCal	protein g	total fat g	carbs g	water %	refuse %
amaranth, leaves	26	2.4	0.33	4.0	91.7	6
amaranth, seeds	374	14.4	6.5	66.2	9.8	0
acorns, raw	369	6.1	23.9	40.7	27.9	38
acorns, dried	509	8.1	31.4	53.7	5.1	38
hickory nuts, dried	657	12.7	64.4	18.2	2.6	68
corn, dry	357	7.5	2.1	79.3	10.0	0
corn, raw	126	2.6	0.7	27.9	68.3	0
persimmon, raw	127	0.8	0.4	33.5	64.4	18

have a higher caloric yield. Acorns have relatively high quantities of carbohydrates, but are low in protein and fats. Hickory is high in protein and fat, but low in carbohydrates.

The nutritive value of amaranth depends a great deal on whether the leaves or seeds are consumed. As might be imagined, the seeds are a far better source of calories, protein, fat, and even carbohydrates than the leaves. It seems likely that amaranth, if used at all, might be similar to persimmon – an occasional or supplemental resource.

Corn is most abundant at 22OK904, being very scarce in the ethnobotanical record at both 22OK905 and 22OK977. This, however, be due to the difference in the samples – 22OK904 did have the largest features, which perhaps allowed the greatest opportunity for the corn to be preserved.

What is perhaps more surprising is that corn is so uncommon in the archaeological record from these sites. There is abundant evidence from other sources that corn was not only present, but that it was sufficiently common to have been fed to the village dogs. It has been suggested that perhaps the nature of clay soils – constantly shrinking and swelling – may have served to damage fragile cupules. This is certainly a possibility.

When other flotation samples from nearby Mississippi sites are examined, corn is always uncommon. The examination of a cob pit from the Owl Creek Mound (22CS502) revealed what was likely 8 (or possibly 10) row Northern Flint corn.
The samples indicated that there were usually three cupules in 10 mm of cob length (extrapolated for all the samples) and that cupule width was about 5 to nearly 6 mm, although this range is restricted by the identification of only cob tip fragments (Trinkley 1994a).

The examination of a sample from a small Mississippian farmstead (22OK595) produced a small quantity of what appeared to be 10-row Northern flint. Again there were 3 cupules per 10 mm of cob length and the cupule width varied from 7.5 to 9 mm (Trinkley 1994b).

A third site, 22WI516, produced a very small quantity of highly fragmented corn. No analysis of cupule width or the type of corn represented was possible (Trinkley 2002). In contrast, examination of samples from a similar small hamlet at 22OK793 (Trinkley 1998) failed to produce any corn.

To these samples we can add the small amount of material from 22OK904 – suggestive of a cupule width of 6 mm and 2.4 cupules per 10 mm of cob length – and 22OK904 – where the width varied from 4.5 to 5.4 mm and there were about 3 cupules per 10 mm.

While there may not be much corn from any of the various sites, the corn that is present appears to be very similar. The width of cupules from 22OK904 is the smallest reported, but this may be the result of the material coming from either tips or tiller ears. Otherwise, the ranges are consistent with samples reported by Cutler and Blake (1977:Table 10).

SUMMARY

Sites 22OK904, 22OK905, and 22OK977 are all small Late Mississippian to Protohistoric farmsteads in east central Mississippi. While of short duration, all are thought to represent year-round settlement with a subsistence base of maize agriculture and hunting.

The materials provided for analysis are all flotation samples from features, burials, postholes, or unit excavations. All feature fill was subjected to flotation, while only 2 l samples of other proveniences were floated. All flotation was using a mechanically assisted water device.

This study found considerable variation in the samples. Relatively few were over 5 g and many contained abundant uncarbonized material. The larger samples tended to provide more reliable results. The unit samples tended to be the least productive – many include a very high proportion of trash and none yielded any plant food remains other than hickory nutshell (which is otherwise well represented in the feature samples).

The most common plant food remain in the samples is hickory nutshell. At 22OK904 it is found in five of the eight features, two of the four burials, and six of the 24 units. At 22OK905 hickory nutshell is found in four of the five features and two of the four examined postholes. At 22OK977 hickory nutshell is found in six of the eight features, but only two of the 17 unit samples. Hickory, however, is hard and dense and tends to be preserved well in archaeological contexts – especially when compared to more fragile materials such as acorn, seeds, and perhaps even corn.

Acorn nutshell is present in the assemblage, albeit in much small quantities and far few proveniences. It is found is no unit or posthole samples, but is recovered in one feature from 22OK905 (out of five) and four features from 22OK904 (out of eight). All of the recovered materials are shell – no meat fragments were identified.

Seeds are relatively uncommon and most are found as noncarbonized fragments. Identified specimens that may have cultural implications include holly or yaupon (*Ilex* sp.), amaranths (*Amaranthus* sp.), and persimmon (*Diospyros virginiana*). Other seeds, such as skullcap (*Scutellaria* sp.) and mullein (*Verbascum* sp.) are more than likely weedy species attracted to the disturbed habitat of the farmstead.

Although I have examined a number of Mississippi ethnobotanical samples (Trinkley 1994a, 1994b, 1998, 2002), corn has never been extremely abundant and has been entirely absent from one collection. In the current study, corn was present at all three sites, but in dramatically different quantities. For example, at 22OK977 corn was found as a trace (less than 0.01 g) in only one sample – Feature 8, Zone 2. At 22OK905 less than 1 g of corn was found in two postholes and a single feature. At 22OK904 corn was found in four features, but amounted to only 0.25 g.

The corn that is found is most likely a Northern Flint (the one kernel present showed no denting). Although cupule size shows considerable variability – almost certainly the result of the small sample size – the size appears consistent with that from other sites in Mississippi.

So while the corn recovered presents us with no surprises, what is surprising – if not actually troubling – is that so little corn is recovered – not only from these three sites, but from others in the same general area.

I have no reason to suspect the method care in floating the samples or preparing the samples. Nor is corn something that is likely to be missed in analysis. It seems far more likely that there is either a cultural reason for corn's low incidence or perhaps some unknown natural factor acting against long-term preservation of even carbonized corn remains.

Corn is preserved in archaeological contexts through burning. This can occur during preparation of the corn as a food, perhaps during roasting an ear falls into the fire or left too long on the coals. If, however, most corn is prepared by boiling, then there would be little opportunity for the corn to be exposed to either flame or coals. Burning may also occur after the fact – perhaps as a means of disposing of the cobs or perhaps as small features intended for producing smoke. In such cases the opportunity for the cob (along with its cupules) to be preserved is much higher.

So the failure to identify much carbonized corn from these small hamlets may be related to the way the corn was processed and the way the cobs were disposed of (or perhaps *not* disposed of). The cob pits that I am familiar with have been found at larger ceremonial sites, such as Town Creek (Trinkley 1995) or Owl Creek (Trinkley 1994a). Perhaps features of this type are not present at small hamlets – thereby reducing the opportunities for large corn samples to be recovered.

Of course, it may be that the corn which is present is further affected by natural features – perhaps as has been suggested by the shrinking and swelling of the clay soils causing fragmentation of the cupules. Some support of this may come from the work revealing the extraordinary bioturbation documented from features (Peacock et al. n.d.).

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