ANALYSIS OF PALEOETHNOBOTANICAL SAMPLES FROM A MISSISSIPPIAN FARMSTEAD, 22OK595, OKTIBBEHA COUNTY, MISSISSIPPI

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ANALYSIS OF PALEOETHNOBOTANICAL SAMPLES FROM A MISSISSIPPIAN FARMSTEAD, 22OK595, OKTIBBEHA COUNTY, MISSISSIPPI

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ABSTRACT

This study reports on the examination of a sample of charred plant remains from 20 features (primarily post holes) excavated in 1976 from a small Mississippian farmstead or hamlet in Oktibbeha County, Mississippi. The site, recorded as 22OK595 and situated in east central Mississippi in the town of Starkville, has been radiocarbon dated to about A.D. 1640 to 1660.

The materials examined include a small quantity of wood charcoal, primarily pine, oak, and hickory; carbonized hickory and acorn nutshell; persimmon; possibly grape; and a small quantity of corn cobs. The corn appears to represent a Northern Flint with 10 rows of kernels with considerable diversity in cupule width. A single corn kernel identified was not dented. While corn was found in 10 of the 19 samples, in all but three the quantity was very small. There is no indication, based on these samples, that corn (or other plant foods, for that matter) were particularly dominant in the diet. Unfortunately, the sample size is very small, limiting the possible conclusions.

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INTRODUCTION

Background

The materials examined in this study were provided by Dr. Homes Hogue of the Cobb Institute of Archaeology at Mississippi State University. The materials included 21 glass jars from 19 proveniences[1], each representing what appeared to be the light fraction produced by water flotation of an unknown quantity of soil. In addition there were eight paper bags with soil blocks wrapped in aluminum foil, presumably collected for possible radiocarbon dating. Each bag represented a different provenience, although all but one were also represented by flotation samples. All of the materials were identified by a specific feature, designated by a letter or combination of double letters.

Site 22OK595, situated in the town of Starkville in Oktibbeha County, Mississippi (Figure 1), was excavated in 1976. Today the site has been destroyed by a housing development (Homes Hogue, personal communication 1994). The site excavations revealed a small protohistoric Mississippian farmstead. Radiocarbon dates from the site indicate occupation between about A.D. 1640 and 1660. While the analysis of the materials is still on-going, the results of a carbon isotope study suggest a diffuse diet, not focused on corn agriculture. This result is particularly meaningful in combination with this study, which may suggest that while corn was present, it was of only limited significance.

The bulk of the material examined in this study comes from post holes, although four proveniences are described by the excavators as "pits." The post holes, at present, are not associated with particular structures. They range in diameter from about 10 to 31 cm (mean is 20 cm) and in depth from 10 to 45 cm (mean is 27 cm). Several of these post holes evidenced clear post hole/post mold distinctions, while at least one suggested to the excavator that the post had been removed intact. While the field notes are not clear, the quantity of light fraction suggests that something approaching all the fill was floated in each case.

Fifteen post holes were made available for study as flotation samples (Features A, G, H, I, L, N, P, R, S, T, V, Y, AA, CC, and FF). In addition five, (Features A, G, H, V, and Y) were also sampled by retaining varying amounts of soil wrapped in aluminum foil (presumably for possible radiocarbon dating).

In addition to the post holes, three pits were provided for study as flotation samples (Features F, BB, and DD). One pit (Feature HH) was provided only as soil wrapped in aluminum foil. Three of these pits are rather non-descript. Feature F measures about 41 cm in diameter and 23 cm in depth, is described in the field notes as "hemispherical, bowl-shaped," although it had "no identified purpose or function" and contained only a "small quantity of charcoal." Feature BB measured 30 cm in diameter and 15 cm in depth. The only other notation concerning this feature was that it contained dark soil with a small quantity of what appeared to be ash. Feature DD was

[1] One glass jar, for Feature II in unit 225R295, broke during transit. This sample was consequently pulverized and was discarded.

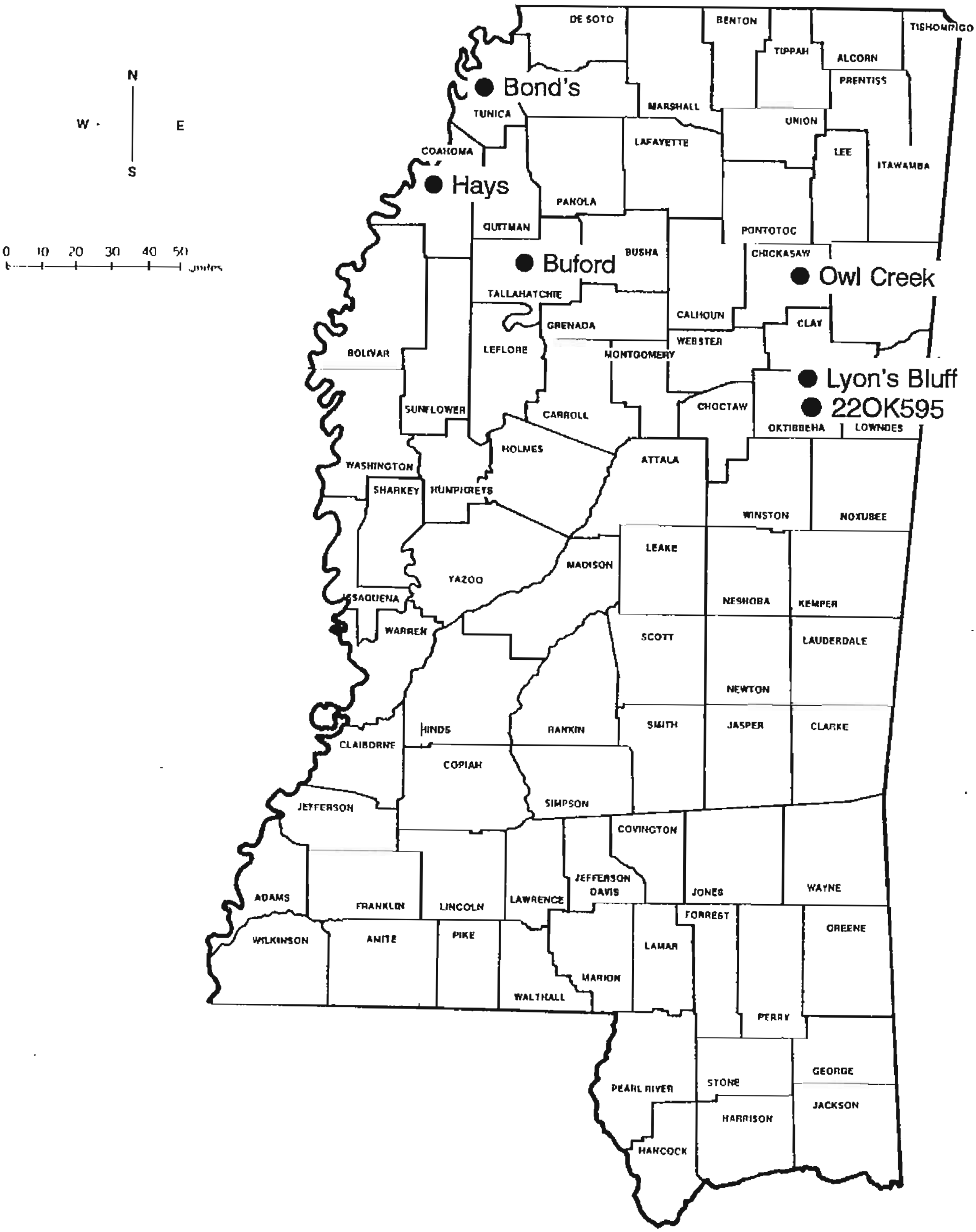

Figure 1. Location of 22OK595 and other sites discussed in this study.

likewise a small pit, measuring about 35 cm in diameter and 18 cm in depth. The field notes indicated that this pit contained several sherds, a small quantity of daub, and some corn cob. No function or purpose was apparent. Feature HH measured about 45 cm by 30 cm in diameter, although it was at most 5 cm in depth. The field notes indicate a large quantity of corn cob, lying on top of what appeared to be burnt clay. The accompanying plan view suggests that originally a large number of cobs were present, primarily laying horizontally in no particular arrangement. It is possible that the upper portion of this pit has been truncated, although no clear information was available in the field notes.

One additional provenience was provided for analysis. Feature K, provided only as a soil sample wrapped in aluminum foil, was described in the field notes as "large pieces of charcoal," suggesting a smear of charcoal, originally removed for possible dating. No additional information was provided on association or potential significance.

It is not possible, with the notes presently available, to speculate on the quantity of material floated or, in some cases, the amount of soil saved. This, however, is a common flaw in field collection and processing of ethnobotanical materials, previously observed by Dr. Gail Wagner (personal communication 1994) from her studies of ethnobotanical reports.

Because of their small size and the large quantity of non-carbonized organic debris (primarily roots) in the flotation samples, each one was hand sorted to yield only the charcoal. Upon examination the soil samples were found to be uniformly hard, with the carbonized remains interspersed throughout. To extract the charcoal from the soil matrix, the blocks were soaked in warm water. Gentle hand agitation resulting in a large quantity of charcoal floating to the surface. This material was skimmed off and allowed to air dry. The remaining heavy fraction was gently washed with low pressure water through an A.S.T.M. No. 20 screen (openings of 0.0331 inches or 841 microns). The light fraction was also allowed to air dry.

All materials examined have been returned to the Cobb Institute of Archaeology for curation.

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 to slightly wooded plain, has developed on the calcareous and micaceous Porters Creek clay. The site, however, is situated in the region known as the Pontotoc Hills.

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 22OK595 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.[2]

Braun (1950) classifies the region as an 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. 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.

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

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. While the materials from 22OK595 represent a number of different features (primarily post holes), most produced very small quantities of ethnobotanical remains (only Features A and HH can be regarded as well sampled). Given these small sample sizes it is likely that extensive discussions are probably not warranted. Certainly the nature of the samples, the size of the collections, and the condition of the materials all affect the ability of this study to offer substantive analyses.

Two analytical techniques were used. After those samples in soil blocks were separated from the matrix using the flotation process previously described, they were examined under low magnification (7x to 30x). Wood charcoal was identified, where possible, to the genus level, using comparative samples, Panshin and de Zeeuw (1970), and Koehler (1917). Wood charcoal samples were broken in half to expose a fresh transverse surface.

Carbonized plant foods and food remains were not broken but were identified on the basis of gross morphological features. The corn was analyzed using the format designed by Ford (1973:188-197). The first observation was the general morphology of each charred cob fragment. If it appeared mature, the cob was recorded as regular (R); cob with the skinny or irregular appearance of a tiller cob or nubbin was recorded as N. Other subjective observations included the shape of the cob in cross-section (circular or oval) and the portion of the cob represented. As Ford notes, the presence of glumes on a cob may alter the apparent shape; where this seemed to be a factor, the cob was arbitrarily recorded as circular (C). The portion of the cob represented was estimated by comparing the carbonized sample to a modern cob and coding it as tip (T), middle (M), or butt (B). The length of the cob fragment was measured (there were no instances of intact cobs and all, in fact, are highly fragmented). The three cupule attributes include assessment of the degree of pairing between cupule rows, the number of cupules in 10 mm of cob length, and cupule width. Cupules were regarded as paired (+) if there was only a narrow groove between the rows, as strongly paired (S) if the grooves are wide, and as weakly paired (-) if the corners of the cupules overlapped. Other analyses, such as seed identification, relied on U.S.D.A. (1948, 1971), Martin and Barkley (1961), and Montgomery (1977).

Typically flotation samples would be processed using the procedures outlined by Yarnell (1974:113-114). This procedure sifts the charcoal through a series of graded screens, with materials in the upper screens identified and the total weights extrapolated. In the case of the 22OK595 samples this methodology would have eliminated the vast majority of the carbonized material (because of its small size). Consequently, each of the samples was first 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). A few of the larger samples (specifically from Features A and T) were further subdivided for sampling (with the total contents extrapolated on the basis of the sampled material).

RESULTS AND COMPARISONS

Flotation Samples

As previously discussed, 18 proveniences were provided for analysis as flotation samples. Three of these were small pits, the others were post holes. Table 1 lists the components of the various samples. Considering the post holes first, in all cases the noncarbonized (primarily organic) debris accounted for between 61.8 and 99.7% of the samples by weight. Another component was wood charcoal, accounting for 0.1 and 38.2% of the samples by weight. Regrettably, the wood charcoal fragments were uniformly too small to permit species identification.

Somewhat surprisingly, a variety of other plant remains were also present in the post hole fill, including corn (found in seven of the 15 post holes), acorn shell (found in two post holes), hickory nutshell (found in six of the 15 post holes), and a single non-carbonized grape seed (*Vitus* sp.). The corn found in the post holes is entirely highly fragmented cupules[3]. The hickory nutshells and acorn fragments are likewise highly fragmented -- often making identification very time consuming. The range of materials coming from the post holes suggests considerable mixing of sheet midden in the process of placing the posts, or alternatively, the gradual filling of rotted posts by still accumulating occupational sheet midden. Either way, the fragmentary nature of the remains is suggestive of considerable mechanical damage, such as pedestrian traffic or associated occupational activities. None of these post holes appear to represent the cob pits or cob post holes often found at mound sites throughout the Eastern United States (see Binford 1967 and Munson 1969 for the original commentary and Trinkley 1985 and 1994 for more recent analysis and interpretation).[4] This negative evidence is interesting since it may suggest the absence of this feature type at domestic Mississippian sites, further strengthening the association of cob pits and ceremonial activities.

Three flotation samples were available for features described in the field notes as "pits" (Features F, BB, and DD). In each case the noncarbonized organic debris dominated, accounting for 77.6% up to 97.9% of the collections. The next most abundant remains in two pits was wood charcoal, accounting for 2.1% of the Feature F sample and 3.6% of the Feature BB sample. Feature BB also produced a small quantity of carbonized corn (accounting for 0.4% of the sample), including a fragmentary kernel. These two features yielded so little material that no conclusions can be drawn concerning their function. Feature DD, however, yielded not only more wood charcoal than most features or post holes (6.2% of the collection), but corn was abundant in the collection (accounting for 16.2% of the sample).

The single fragmentary kernel provided an opportunity to examine the corn present at 22OK595 for evidence of denting. Denting is caused by the extension of the starchy endosperm to

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[3] A cupule is a pocket on the cob in which a pair of grains is borne.

[4] It is appropriate to note that Feature T did contain abundant corn (accounting for slightly over 22% of the flotation sample). However, the material was highly fragmented and there is no indication in either the collection or the associated field notes that cobs were present intact in the post hole.

Table 1.
Flotation Sample Components from 22OK595,
weights in grams

	Wood Charcoal		Uncarb. Organic		Corn		Plant Foods Acorn		Hickory		Seeds			
Provenience	wt	%	wt	%	wt	%	wt	%	wt	%	wt	%	Total	Seeds
Postholes														
A	1.43	0.7	182.60	96.9	4.28	2.3			0.21	0.1			188.52	
G	0.67	1.8	35.48	97.9	0.07	0.3							36.22	
H	0.43	2.8	14.66	97.1									15.09	
I	0.09	0.1	95.81	99.7			0.04	0.1	0.10	0.1			96.04	
L	0.53	4.6	10.81	94.4	0.02	0.2			0.09	0.8			11.45	
N	0.04	0.5	7.63	99.5							>0.01	>0.1	7.67	nc *Vitus* sp.
P	0.57	4.6	11.40	92.3	0.02	0.2	0.06	0.5	0.30	2.4			12.35	
R	1.85	38.2	2.99	61.8									4.84	
S	0.07	2.6	2.66	97.4									2.73	
T	0.94	5.8	11.62	72.1	3.56	22.1							16.12	
V	0.24	1.9	12.09	98.1									12.33	
Y	0.23	1.5	15.22	97.7	0.07	0.5			0.04	0.3			15.56	
AA	1.83	36.7	3.16	63.3									4.99	
CC	0.07	0.9	7.93	99.0	0.01	0.1							8.01	
FF	0.01	0.1	13.57	99.8					0.01	0.1			13.59	
Pits														
F	0.37	2.1	17.58	97.9									17.95	
BB	0.19	3.6	5.01	96.0	0.02	0.4							5.22	
DD	0.84	6.2	10.54	77.6	2.21	16.2							13.59	

the apex of the kernel, which is otherwise encased in corneous material. As the grain dries, the corneous part remains unchanged, but the starchy endosperm shrinks and the top of the kernel is drawn downward, forming the characteristic denting in the end of the grain (Burtt-Davy 1914:278; Weatherwax 1954:199). The one sample from 22OK595 is not dented; instead it suggests a corneous endosperm completely enclosing the starchy endosperm, a characteristic of flint corn (Burtt-Davy 1914:278; Weatherwax 1954:199).

Species ubiquity, which is simply the percentage of proveniences in which a particular species was present, provides information on how wide spread a species is within the archaeological record (as preserved, collected, and analyzed). The most common plant remain was wood charcoal, found in all of the proveniences. Corn was found in 47% of the post holes and 67% of the pits. Hickory nutshell was found in 40% of the post holes, but none of the pits. Likewise acorn shell was found in 13% of the post holes, but was absent from the pits. Overall, corn has a 50% ubiquity, hickory nutshell a 33% ubiquity, acorn a 11% ubiquity, and seeds only a 5% ubiquity.

This data must be very cautiously interpreted, given the small sample size, our limited information regarding collection procedures, and our understanding of differential preservation (especially between dense hickory nutshell and fragile acorn shell). Regardless, it suggests that corn was a relatively common plant food commodity, followed by the collection and processing of hickory. Acorn and other seeds appear to be relatively minor aspects of the diet.

Hand Picked Samples

A series of seven hand picked samples were also provided for analysis. Five of these samples (from Features A, G, H, V, and Y) are from post holes, one (Feature K) is from a charcoal smear, and one (Feature HH) is perhaps a feature. In many cases the charcoal in these samples was large enough to allow species identification. One of the samples allowed analysis of corn cob samples, and several contained cupules suitable for width measurements. Each will be briefly discussed.

Feature A produced five fragments of charcoal suitable for species identification, revealing three pieces of *Pinus* spp., one fragment of *Carya* sp., and one fragment of *Quercus* sp. In addition, six cupules were suitable for measurement, yielding a range of 6.78 - 8.84 cm, a mean of 7.51 cm and a standard deviation of 0.89 cm.

Feature G contained only small fragments of wood charcoal, none of which were large enough to permit species identification.

Feature H also contained only wood. Four fragments were examined and all represented *Quercus* sp.

Feature V, which was contained in a bag labeled, "corn cob maybe some post," was found to contain only wood charcoal identified as *Quercus* sp. No corn was present.

Feature Y contained abundant corn cupule fragments, four pieces of badly fragmented carbonized persimmon seed (*Diospyros virginiana*), and two fragments of hickory nutshell. Persimmon is a deciduous tree which produces a fleshy berry. It is typically found in dry deciduous forests, pinelands, and old fields. They flower in late summer and fruit between September and October. Persimmon was a food source well known to the Southeastern Indians (see Swanton 1946:Table 2), although it does not appear to have been heavily utilized at 22OK595.

Feature K was identified as a smear of charcoal and removed for possible radiocarbon dating. The material consists entirely of wood charcoal, identified in this study as *Juglans* sp.

Feature HH, as previously described, was a very shallow feature with abundant charcoal and charred corn cobs. While the charred materials present indicate that the feature contents were burned in a low oxygen fire, suitable for reduction but not full combustion, little more can be said concerning the function of the pit.

This analysis of Feature HH revealed only two identifiable wood species: *Quercus* sp. and *Carya* sp. The remainder of the collection consisted of highly fragmented and pulverized corn cob, largely carbonized cupules. The collection did contain three small intact cob fragments, discussed below in Table 2. This table follows Ford's (1973) standard so as to provide a thoroughly documented comparative collection for future researchers. Each of the three samples represented 10-row corn, with two of the cobs representing mid-sections. No tiller or nubbin ears were present.

Cupule rows were most commonly strongly paired. The sample size precluded identification of poor or incomplete cross-pollination, or irregularly aligned kernels. The available sample indicated that there were usually three cupules in 10 mm of cob length and that cupule width was about 8 to 9 mm. Cupule fragments present in the collection revealed a range of cupule width from 7.98 to 12.40 mm, with a mean of 10.18 mm and a standard deviation of 1.66 mm.

All of the identified fragments clearly indicated that the kernels were removed before the cob was burned. Examination of the associated fragments produced no kernels fragments or charred kernels. The failure to identify kernels precludes examination for denting, although there is evidence from a single fragmentary kernel in Feature BB that the specimens represent a flint corn.

Table 2.
22OK595 Cob Fragments

	Cob					Cupule		
Specimen No.	Type	Row Number	Cross Section	Length (mm)	Area Measured	Pair	Number 10 mm	Width (cm)
1	R	10	C	22	M	+	3	9.0
2	R	10	Q	20	T	+	3	7.5
3	R	10	Q	11	M	W	3	7.6

Key: Q = quadrangular
C = circular
M = mid-section
+ = paired
W= weakly paired
R= regular cob

It is likely that there were three races of corn in aboriginal eastern North America, exclusive of the pop and sweet corns: Northern Flints (also known as Eastern Complex corn), Southeastern Dents, and Southeastern Flints. Northern Flints, found centered in the Northeast, were characterized by ears possessing 8 to 10 rows of crescent-shaped kernels (that is, kernels wider than high), short plants that were highly tillered, and ears that were frequently enlarged at the base (see Brown and Anderson 1947; Carter and Anderson 1945; Jones 1949, 1968; Brown and Goodman 1977). Cobs were large, and grooves separated the cupules. Southern Dents, found primarily in the Southeast, were noted for plant height and rarely produced nubbin ears. Rows ranged in number from 8 to 26, and the kernels were well dented; the cob frequently had an enlarged base. The race of corn was widely grown in the Southeast during the Colonial period (Brown and Goodman 1977:77; Kalm 1974). The last major race, Southeastern Flint, had short cobs, ears of 12 to 14 rows, and an ear that was slightly compressed at the base and gently tapered to the tip. Brown and Goodman note that this race is limited to the historic period, with earlier prehistoric materials more closely resembling the Northern Flints.

It appears, based on an admittedly small sample that the 22OK595 corn is an example of the Eastern Complex corn of which the Northern Flints were an extreme form. The cobs have 10 rows of kernels. Several of the cobs had the characteristic quadrangular cross-section.

The presence of Eastern Complex corn at 22OK595, which dates from the seventeenth century A.D. was to be expected. Ford (1973:190-191) notes that these traits became more prominent through time, with a very high degree of Easternization (not clearly present in the examined sample) indicative of the Contact period.

Cutler and Blake (1977), exploring the corn from Cahokia sites, reference four well examined corn collections from Mississippi: Lyon's Bluff (22OK1), Buford (Tallahatchee County), Hays (22CO612), and Bond's (22TU530) (see Figure 1 and Table 3). To these can be added the recently examined material from Owl Creek Mound (Trinkley 1994). Site 22OK595, with 10-row corn, is well within the mid-range of these comparative sites (with mean row numbers ranging from a low of 8 at Owl Creek to a high of 12 at Bond's). The mean cupule width of 8.0 for the intact cobs at 22OK595 is at the upper end of the observed range of 5.6 and 8.1. The mean cupule width of 10.18 for the cupule fragments exceeds the observed range for the comparative sites, perhaps indicative of the late dates for 22OK595.

Table 3.
Mississippi Corn Samples

Site	Date	# of Cobs	Mean Row #	Median Cupule Width in mm.	Row Numbers % Total Cobs 8	10	12	14	18+
Lyon's Bluff	A.D. 1200-1500	78	10.8	6.1	10	46	39	4	1
Buford	A.D. 1200-1500	2	9.0	8.1	50	50			
Hays	A.D. 1000-1200	14	11.6	6.4	7	29	50	7	7
Bond's	A.D. 800 - 900	7	12.0	6.4		29	43	28	
Owl Creek	A.D. 1050-1150	4	8.0	5.6	100				

Data from Cutler and Blake (1977:Table 10), Trinkley (1994:Table 1).

Summary

When the paleoethnobotanical remains at 22OK595 are compared to other Mississippian sites there are clear similarities -- the most obvious of which is certainly the presence of a corn typical of Northern Flints. Some aspects of the corn are outside the parameters which might be expected, such as cupule width, although this may be explained by the late date of the site. Corn has a ubiquity of 50%, being found highly fragmented in even post hole fill, and somewhat more intact in features. There is no evidence of cob pits at 22OK595. Corn is also the only cultigen present at 22OK595 -- absent from the collection are items such as squash, gourd, sunflower, and sumpweed, all frequently found at Mississippian sites. Regrettably, the sample size is inadequate to offer any explanations for these absences.

The presence of pine, oak, hickory, and even walnut wood charcoal is to be expected in this area of Mississippi. Perhaps the only real surprise is that a greater variety of woods were not found in the samples.

Two species of hard mast remains were present: hickory and oak. Hickory, found as nutshell, was the most common (ubiquity 33%). Oak acorns occurred in this collection only as shell, with a low ubiquity of only 11%. Certainly the apparent ratio of these resources may be skewed as a result of collection techniques, or even fragmentation since collection -- the denser, less fragile hickory is better preserved than the less dense and more fragile acorn shell. The data from 22OK595 thus offer little toward the resolution of the debate over acorn/hickory use by agriculturalists (see Caddell 1982 and Moore 1984).

Hickory is a component of the climax vegetation of the site area (Kuchler 1964, Shelford 1963) and should have been common in the site vicinity. Hickories are generally good producers, with yields ranging up to 3 bushels of nuts per tree and good masts at least every third year (U.S.D.A. 1974). The nuts are easily stored and the kernels are a good energy source during the early winter period when corn reserves might be low. Acorns share similar advantages as hickory nuts. Oaks, like hickories, are a component of the climax vegetation of the site vicinity and can produce large yields fairly frequently (U.S.D.A. 1974), generally dropping before December. They are also good sources of energy, typically having abundant carbohydrates. In this sense they complement hickories, which tend to have a high fat content, but low carbohydrate yield. While walnut wood is present in the collection, walnuts were apparently not sought after. Unlike hickories and oaks, walnut trees do not form stands, but rather are usually scattered throughout the forest (Strode 1977:151). Hence, gathering walnuts would require a greater expenditure of time and energy than gathering either acorns or hickories.

Only two fleshy fruits were found -- persimmon and grape. Both are heliophilic species which would have benefited from the forest opening activities of the site inhabitants. Grape is found in only one provenience and the one specimen was at least partially non-carbonized. Consequently, its temporal affiliation with the site occupation is uncertain. Regardless, it seems that it would have been of only limited importance. Grape is available fresh in the late summer and fall, although at least one author suggests that Southeastern Indians dried quantities of grapes for later use (Harper 1958:254). Persimmon was also encountered, probably reflecting occasional collecting of incidental species. Absent from the collections are other typical fleshy fruits, such as bramble, plums, and strawberry.

Also absent from the collections are grass seeds (typically present as "weedy" plants around the dwellings) and forbs (such as *Chenopodium* sp.), which were often exploited as potherbs and for their edible seeds.

Relatively few conclusions can be drawn from the available collection. For example, not only is inferring the season of occupation based on botanical remains complicated, but at this site many of the fleshy fruits suggestive of different seasons are absent. While persimmon and grape are suggestive of a fall season, occupation during the remaining seasons cannot be discounted. Likewise, it is difficult to interpret the subsistence strategy at 22OK595. Corn, while the most common plant food found in the samples, does not seem to dominate the collections.

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