An Ethnobotanical Analysis of Two Late Mississippian Period Sites in the Upper Yazoo Basin

By

Sarah E. Settle

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Approved:

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Dr. C. Margaret Scarry (advisor)

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Dr. Vincas P. Steponaitis

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Dr. Brett H. Riggs

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Introduction

Between A.D. 1000 and 1600, people throughout much of the American Southeast lived in broadly similar societies, known to archaeologists as Mississippian societies (Steponaitis 1986). For decades researchers have tried to pin down a concise, one size fits all definition of these Mississippian cultures. The current definition of Mississippian includes mound-and-plaza ceremonialism, hierarchical sociopolitical organization, and intensive corn (*Zea mays*) agriculture (Steponaitis 1986). Recent scholarship has shown, however, that while these are widely shared characteristics among Mississippian polities, there is much variation in how and what parts of Mississippian culture regional peoples adopted (see Knight 2006). A good portion of this scholarship has focused on regional variability in Mississippian subsistence strategies (see Fritz 2000; Scarry 1993 for syntheses). My paper contributes to the study of Mississippian subsistence variation through archaeobotanical analyses of samples from two sites in Mississippi.

The region of focus for my study is the northern portion of the Yazoo River Basin (Figure 1). The Yazoo River Basin (commonly referred to as the Mississippi Delta) is located in the Northwest corner of Mississippi. It is the area that lies between the Mississippi River to the west and the Yazoo River to the east. It is bounded on the north by Memphis, Tennessee and on the south by Vicksburg, Mississippi. The Yazoo River Basin is the largest of the Mississippi River Basins and enjoys fertile, productive land as a function of being a large floodplain. The Mississippi River floods annually, renewing the nutrients in the soil and making it a prime area for agriculture and cultivation. The basin is divided into the Upper (northern) and Lower (southern) Yazoo along the so called “Green Line” which connects Greenville and Greenwood, Mississippi. In late prehistory, cultures lying to the south of this line were markedly different than those to the north (in our area of interest) as noted by many researchers (Phillips 1970; McNutt 1996). For this reason the dividing line between the Central and Lower Mississippi River Valley is also the “Green Line,” with the Upper Yazoo Basin designated as a part of the Central Mississippi River Valley and the Lower Yazoo Basin as part of the Lower Mississippi River Valley. The material culture found in the two parts of the Yazoo exhibits striking differences. These differences can be most clearly seen in ceramics from the area (Phillips 1970; Starr 1984).

In spite of the archaeological richness of the Upper Yazoo, not much is known about how Mississippian culture was adopted by people living in the area. Initial research used the Lower Yazoo Basin and the Lower Mississippi River Valley as an analogy for the Upper Yazoo Basin. Current work, however, looks across the river towards Arkansas and into the Central Mississippi River Valley for comparison because ceramic typologies and settlement patterns more closely align with those in Arkansas and Missouri than with those in the Lower Mississippi River Valley portions of Mississippi and Louisiana (Stevens Nelson, personal communication 2011).

With this in mind, my study examines plant utilization at Carson Mound Group and Parchman Place, two mid to late Mississippian-era sites located within the Upper Yazoo Basin (Figure 1). My main research goals were: to determine what plants were used at each site, what intra- and inter-site differences in plant use, if any, were present, and to compare plant utilization at the sites against regional Mississippian trends for the Mississippi River Valley. To address these issues, I analyzed plant remains recovered by flotation from ten samples: five from Carson Mound Group and five from Parchman Place.

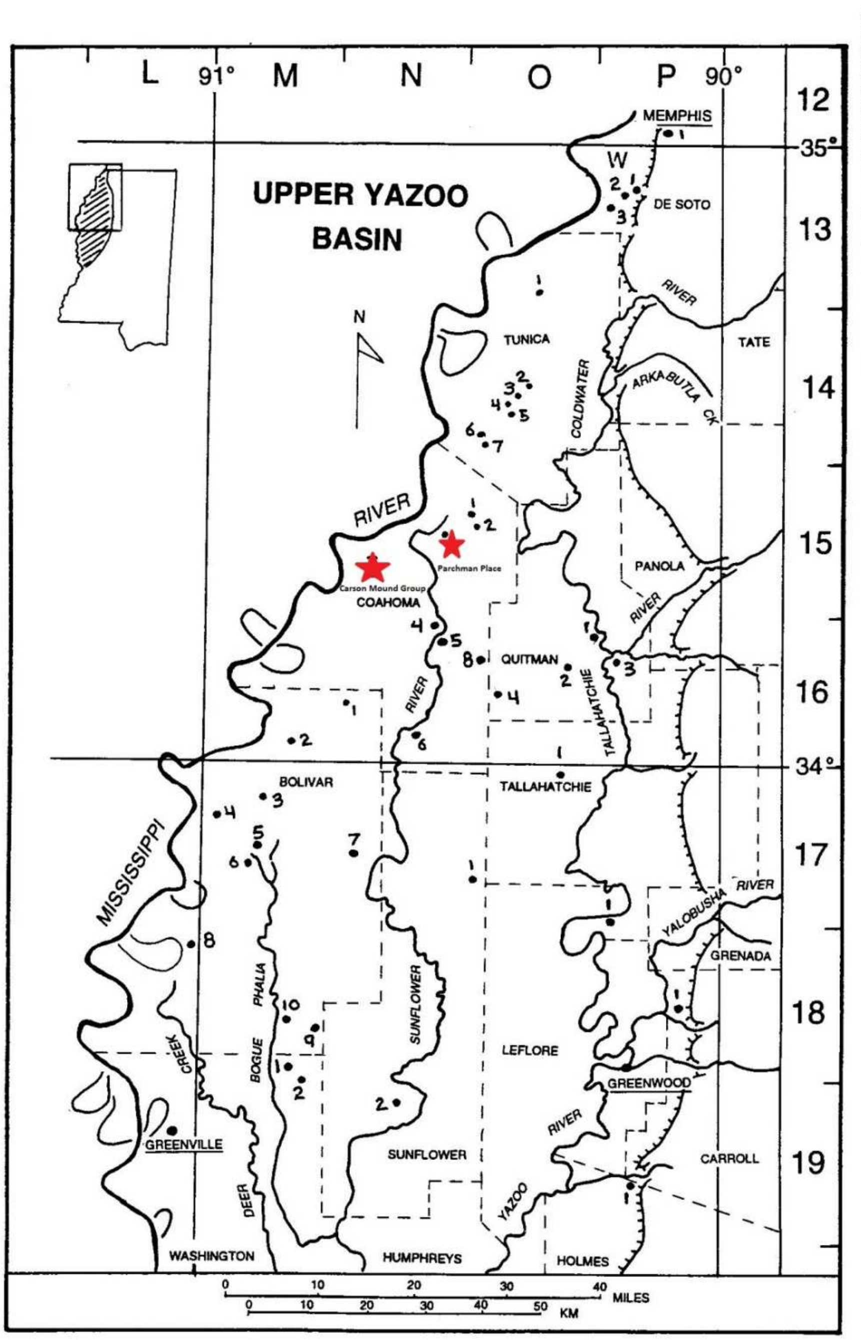

Fig. 7-3 Some major sites in the Upper Yazoo Basin

Figure 1. Map of Upper Yazoo Basin with Carson Mound Group (left) and Parchman Place (right) highlighted. Adapted from McNutt 1996.

Background

For archaeologists working in the American Southeast, the dawn of Mississippian marks the emergence of hierarchical societies, big temple complexes located on large earthen mound constructions, large-scale food production carried out through corn agriculture, and highly structured settlements that reflect social divisions. Ethnobotancial research has intensified within the past several decades. As a result archaeologists have learned that changes in economy and foodways towards typical Mississippian patterns were not a straight-forward process. People in various places did not adopt all of the features of Mississippian foodways and economic systems but rather blended features of the suite with those already in practice.

The cultural influence of the Mississippians can be seen over most of the midwestern and southeastern portions of the United States. Given this broad distribution, it is not difficult to imagine that what it meant in one area differed from others. This is especially true when considering subsistence practices. Before Mississippian foodways disseminated through the Eastern Woodlands, each region already had its own subsistence strategy in place. In 2000, Gayle Fritz constructed an overview of Mississippian subsistence practices along the Mississippi River. This work is a good example of how the use of Mississippian subsistence practices varied regionally. Fritz found that depending on where a settlement is located along the Mississippi River the dates for the introduction and eventual intensification of corn can vary by several hundred years. Once corn agriculture was adopted, Fritz found that it was not always the dominant crop. In the Upper Mississippi River Valley she found that corn, bean (*Phaseolus vulgaris*), squash (*Cucurbita pepo*), and native seed crops such as chenopod

(*Chenopodium berlandieri*), sunflower (*Helianthus annus*), and sumpweed (*Iva annua*) were all being cultivated together. In the Central Mississippi River Valley, Fritz saw corn agriculture as the dominant system starting around A.D. 1400, with squash and beans rounding out the "trinity" by the time of contact; all of the once abundant native seed crops declined except sunflower. In the Lower Mississippi River Valley, Fritz found that corn agriculture became intensified between A.D. 1200 and 1400, with masts and native fruits, acorn (*Quercus* sp.) and persimmon (*Diospyros virginiana*) specifically, still gathered. This matches the variability found by other researchers in regions outside the basin (see Scarry 1993 for a synthesis of this research).

General Mississippian subsistence involved the adoption and rapid intensification of corn. Between A.D. 1000 and A.D. 1200, people throughout much of the Eastern Woodlands began to farm and eventually intensively produce corn. Corn had been present in these areas for close to a thousand years but had not been a part of large-scale food production. Instead, in most places people were cultivating or gathering a suite of native crops commonly referred to as the Eastern Agricultural Complex (EAC). The EAC crops include chenopod, maygrass (*Phalaris caroliniana*), erect knotweed (*Polygonum erectum*), sumpweed, sunflower, and little barley (*Hordeum pusillum*). The extent to which native peoples continued their gathering or cultivation of EAC crops after the adoption of large-scale corn production is dependent on the region.

Fritz (2000) uses a synthesis of research data to develop a broad idea of the patterns that Mississippian-era subsistence followed in various parts of the Mississippi River Valley. For her discussion of the Central Mississippi River Valley, Fritz gives a long a detailed history of how and when the EAC crops began to appear. All of the EAC crops' earliest appearances in the archaeological record occur within the area she denotes as the Central Mississippi River Valley. Fritz (2000) notes that the cultivation of native seed crops was heavily intensified through the Middle (100 B.C. to A.D. 300) and Late Woodland periods (A.D. 300-800) in the Central Mississippi River Valley. She goes on to note that sites from the Central Mississippi Valley that date to this period yield "thousands or even millions of carbonized seeds in large pits dug for storage." This level of intensification is unique to the area and continues alongside the intensification of corn and corn agriculture starting around A.D. 800 (Fritz 2000). Her synthesis indicates that a mixed crop strategy was used until A.D. 1400. It is at this point that Fritz notes the subsistence strategy changed to corn dominated agriculture with beans, squash, and sunflower serving as other main crops. She also notes a general decline in the use of other EAC crops.

Although Fritz aligns the Upper Yazoo Basin under the category of "Central Mississippi River Valley;" it is useful to examine the adjacent Lower Mississippi River Valley region as a point of comparison. The majority of Fritz's discussion of the Lower Mississippi River Valley concentrates on the Coles Creek culture and Coles Creek sites (A.D. 600-1200). The northernmost reach of the Coles Creek culture extends just into the southernmost part of the Upper Yazoo Basin. In the regional chronology of both the Lower Yazoo Basin and the broader Lower Mississippi Valley, the Mississippian period is divided between the Coles Creek extending into what would be considered early Mississippian outside the valley and the Plaquemine and Late Mississippian phases making up the bulk of the Mississippian period (Fritz 2000:229). This is important because the Coles Creek people had their own distinct culture (which includes economic and subsistence practices). The Coles Creek culture did not have much impact in the northern Yazoo Basin. The material culture associated with Coles Creek and later Plaquemine peoples is not found in the upper two thirds of the northern Yazoo Basin, in fact a separate and unique set of material culture can be found (see Phillips 1970; Starr 1984). But, nevertheless, the Upper Yazoo Basin is surrounded by Coles Creek culture and Coles Creek sites.

While not proof that subsistence practices were different, the presence of differences in material culture between the southern and northern Yazoo does give pause to assuming foodways were the same across both regions. It might be helpful then to look at other areas around the northern Yazoo Basin as well as the southern Yazoo Basin and the Lower Mississippi River Valley as points of comparison.

The Upper Yazoo Basin falls in a geographical place that is at the southernmost point of the Central Mississippi River valley and the northernmost point of the Lower Mississippi River Valley. In terms of material culture, it does not quite fit in either category so more often than not sites in the Upper Yazoo get over looked by archaeologists who work in those areas. This is understandable given that it is a small area and an outlier when mapping regional trends. Due to the significant culture differences between the Upper and Lower Yazoo, it is worthwhile to look outside the basin and even across the river to northeast Arkansas, southern Tennessee, and southeast Missouri for comparable economic and subsistence strategies (Stevens Nelson, personal communication 2011). Although these areas are considered a part of the Central Mississippi River Valley like the Upper Yazoo Basin, they are not always considered as places of potential comparison (see Phillips 1970; Phillips, Ford and Griffin 1950) In

“Variability in Mississippian Crop Production Strategies” Scarry (1993) summarizes research reports from scholars working in part of this area—the Arkansas lowlands. Scarry finds that prior to the Mississippian period, peoples in this region relied heavily on native crop production and after A.D. 1100 they switched to a similarly intensive corn production. Scarry does not completely rule out the idea of a mixed crop strategy, as noted in her concluding remarks, but seems to imply that corn had become the dominant crop. Scarry’s findings are comparable to Fritz (2000)’s findings in the Central Mississippi River Valley.

The Sites

Carson Mound Group and Parchman Place are two Mississippian-era sites located in the northwest of Mississippi in the upper Yazoo river basin. The two sites are approximately 15 miles apart in Coahoma County. Given the closeness of the sites and the known variation within Mississippian period crop production, my thesis is aimed at comparing plant use between the two sites and against both broad and regional Mississippian expectations. In order to do this, I selected and analyzed five flotation samples from each site.

Carson Mound Group

Carson Mound Group (22CO518) was occupied from the Middle Woodland period (A.D. 1 to 500) to the Late Mississippian period (A.D. 1400 to contact) (Figure 2). When first recorded by Phillips, Ford, and Griffin (1950) as a part of the Lower Mississippi Valley Survey, the Carson Mound Group comprised over 80 earthen mounds across 150 acres. Most of these 80 mounds were house mounds with approximately six having possible ritual or ceremonial use. Carson Mound Group has been under investigation by archaeologists from the Mississippi Department of Archives and History (MDAH) and the University of Mississippi. Work was begun in the winter of 2007 when MDAH was contacted after a burial was found at the site during land leveling. In 2008, the University of Mississippi conducted a field school which focused on excavating the northeast portion of the area near Mound A that is enclosed by a palisade.

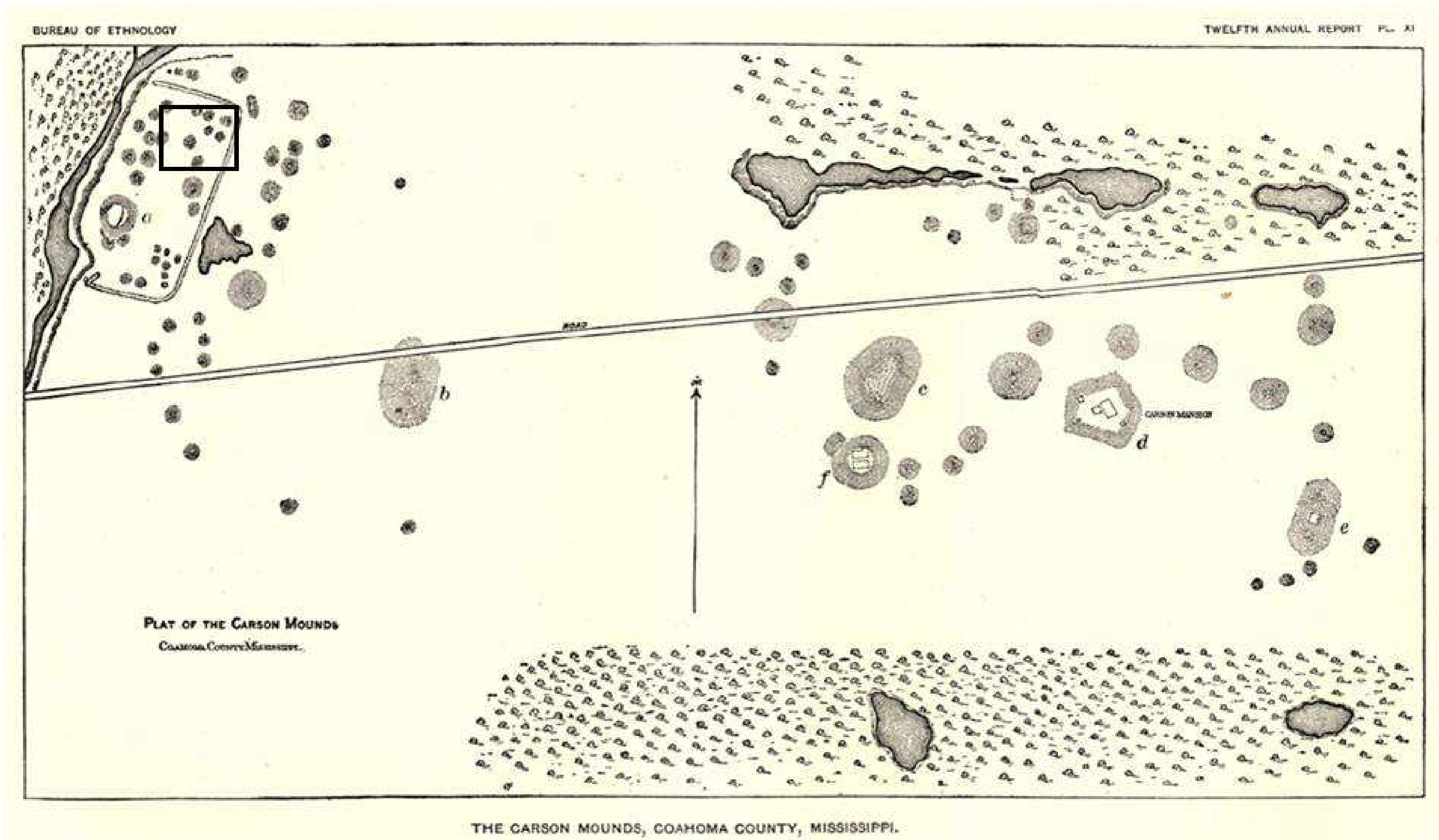

Figure 2. Map of Carson Mound Group indicating the area studied. Adapted from Thomas 1894.

This study focuses only on the late Mississippian occupation of the site, specifically a palisaded area around Mound A. Mound A and the surrounding palisaded area have been tentatively dated to the Late Mississippian Period through Lansdell's (2009) analysis of the ceramic assemblage associated with Carson Mound Group. Lansdell finds that 72% of classified ceramics found in the area around Mound A are Mississippian. Among the ceramics within the palisaded area, there is a significant amount of painted ceramics especially varieties associated with the Late Mississippian period (Lansdell 2009). James (2010) notes that painted ceramics are often associated with burials at Carson Mound Group and that no burials had been found outside of the palisaded area around Mound A.

The palisaded area is thought to indicate elite use of the area (Stevens Nelson, personal communication 2012). There is extensive evidence of habitation through post holes and structural remains (James 2010). James (2010) notes that there is a mortuary program at the site. She believes the area was residential before becoming a necropolis. There are over 47 known secondary burials at Carson Mound Group. Over 30 of these, belong to what James and others, who have been working on the site describe as a cemetery with a mass grave located within the palisaded area around Mound A. James designation of Carson Mound Group as a necropolis comes from the fact that all of the burials are located within the palisaded area associated with Mound A. According to James this indicates a sectioning off of the site that is believed to have some significance. Much of the site has been destroyed by modern activities—houses have been built on several of the remaining mounds and much of the leftover space has been bulldozed or subject to modern farming practices.

The five samples I analyzed from Carson Mound Group came from pit contexts in a prehistoric palisaded area, identified as Mississippian, surrounding Mound A (Figure 2). One of the samples came from a pit associated with a burial. The other four samples came from isolated pits. We do not know whether these were associated with household deposits or mound-related activities. Given the location of all the pits within the palisade and their proximity to Mound A, it seems likely that they are derived from elite activities of some kind. It is also possible that the pits are associated with mortuary ritual.

Parchman Place

Parchman Place (22CO511) is located just outside the city of Clarksdale in Coahoma County, Mississippi (Figure 3). It was a Late Mississippian site occupied from A.D. 1250 to 1650 as dated by classification, and seriation, of the ceramic assemblage and radiocarbon dating. The site is a ceremonial center, which contains five mounds (numbered A through E), a plaza, and at least three discrete residential areas (Neighborhoods 1 through 3). There is some thought by researchers working in the area that Parchman Place may be subordinate to Carson Mound Group in the regional hierarchy.

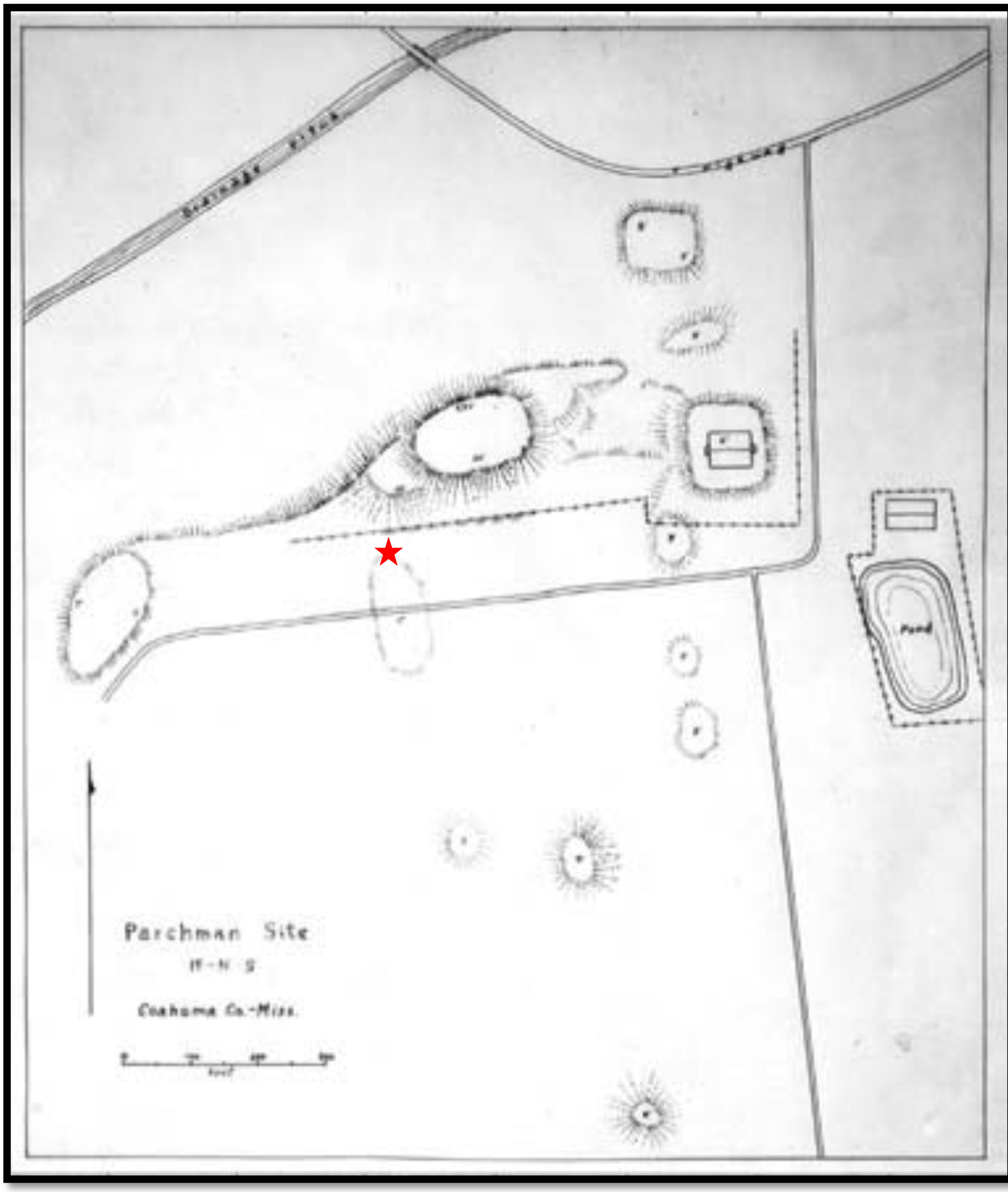

Figure 3. Map of Parchman Place with area of study indicated. Courtesy of Stevens Nelson and adapted from 1940 Lower Mississippi Survey Map from LMS Archives Online (http://www.rla.unc.edu/lms).

Excavations at the site have been underway since the early 2000's under the direction of Jay Johnson from the University of Mississippi. Johnson's work has primarily focused on Mound A and the area surrounding it. Before Johnson's work only surface collections and survey data had been compiled. In 2011, Erin Stevens Nelson conducted excavations at Parchman Place as a part of her dissertation work at the University of North Carolina at Chapel Hill. Stevens Nelson focused on excavating a large trench in a midden or refuse deposit outside of Neighborhood 1, just south of Mound A (Figure 4). All of the plant samples that I analyzed came from these excavations. According to Stevens Nelson, the samples from Parchman Place come from a deposit of what is most likely household refuse that has been gathered up in one area and mounded. At Parchman Place, the foundations for houses are platforms that in their current state appear as mounds of similar size. This refuse mound is different; it has no evidence of structures on top. There is evidence of structures nearby; in fact the refuse mound is adjacent to what Stevens Nelson has identified Neighborhood 1 (Figure 4). Stevens Nelson thinks the mounded fill is a ritual deposition of domestic refuse. The stratigraphy of the mound also contributes to Stevens Nelson's hypothesis. The mound contains distinct layers of ash and other soil. There is no reduction or oxidation in the soil surrounding the ash layers, indicating to Stevens Nelson that the ash was not created by a burning episode that happened *in situ* and was deposited there after being burned elsewhere. Stevens Nelson suggests that the ritual significance of the mound could be that the refuse is a part of a community cleaning and renewal ceremony (like the Green Corn Ceremony) or refuse from feasting episodes. The five samples I analyzed from Parchman Place come from distinct strata within this refuse mound.

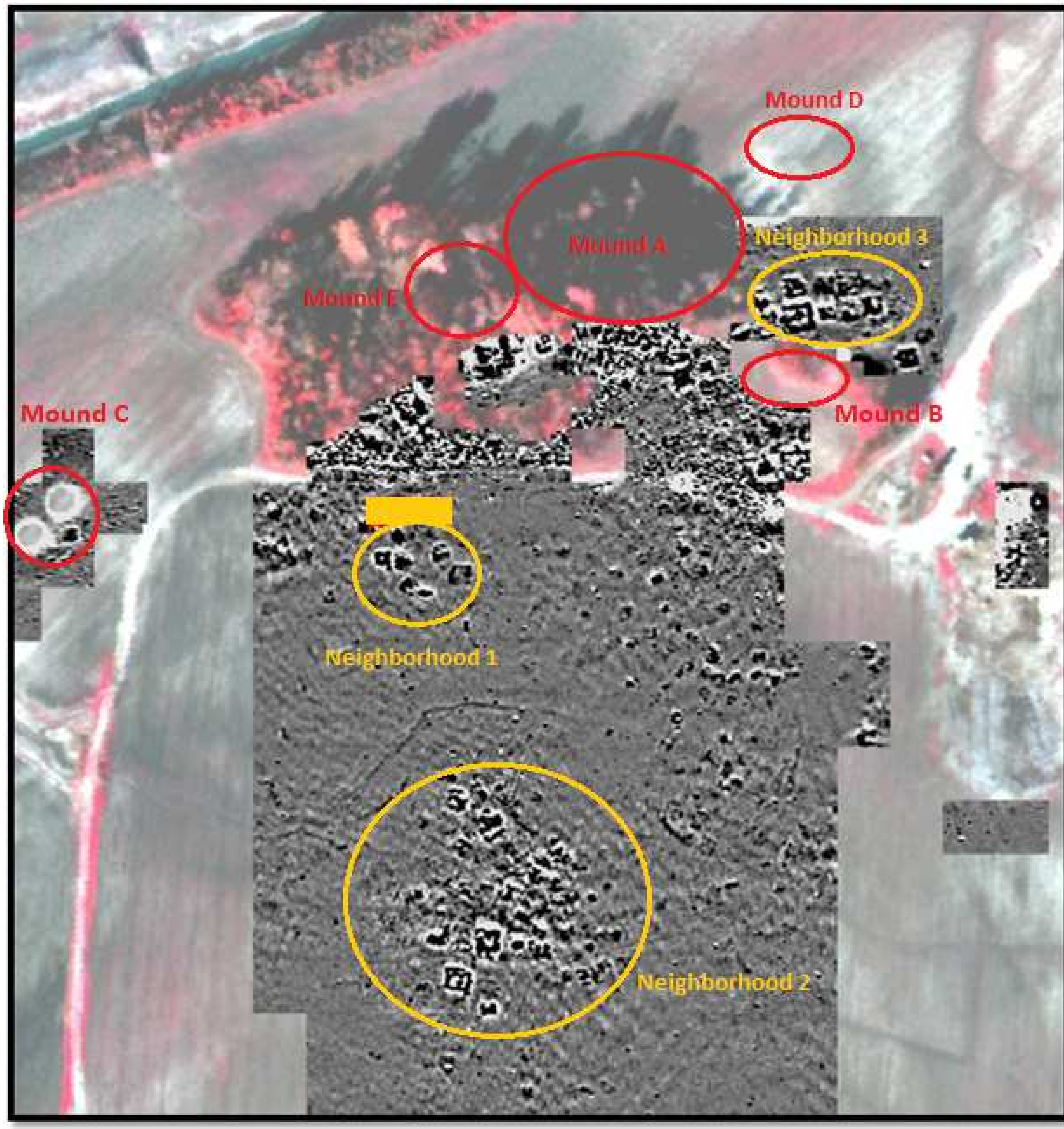

Figure 4. Magnetic gradiometry map of Parchman Place indicating feature areas. The filled yellow rectangle indicates Stevens Nelson's excavated trench. Map courtesy of Stevens Nelson.

Methodology

Recovery and Sample Selection

All samples were recovered through flotation using procedures that were designed to recover carbonized plant remains from the archaeological contexts. Soil samples were submerged in continuously agitated water to separate the soil matrix from the carbonized remains. While the soil was being washed away, the sample separated itself into two parts: the light and heavy fractions. The light fraction is the portion of the carbonized plant remains that float on the top of the water, while the heavy fraction is the portion of the sample that sinks to the bottom of the collection bin. Erin Stevens Nelson processed all the samples from both Carson Mound Group and Parchman Place using a SMAP type flotation machine. For the heavy fraction standard size window screen mesh with an approximate opening of 1.58 mm was used. Fine gauze fabric, akin to cheese cloth, was used to capture the light fraction.

Due to time limitations, it was impossible for me to analyze all samples collected from both sites; instead I chose five samples from each site, pulling them from a variety of contexts to maximize the range of plant data from each site. Burial contexts from Carson Mound Group were avoided because it was not possible to determine whether the samples were collected from mixed fill or materials that were deliberate parts of interment. Nonetheless, one sample from a pit associated with a burial (Carson 98) was unintentionally selected for analysis due to a labeling error.

Lab Methods

I analyzed the samples from both Carson Mound Group and Parchman Place at the Paleoethnobotany Laboratory in the Research Labs of Archaeology (RLA) at the University of North Carolina at Chapel Hill under the supervision of Dr. C. Margaret Scarry. All of the samples were sorted by hand. As a result of flotation procedures, the samples had been divided into light and heavy fractions. I analyzed both portions of all samples. I sorted and identified the plant materials using standard archaeobotanical procedures. First, I weighed each portion of the sample and recorded the weights in grams. Next, I filtered each fraction using a set of three geological sieves with meshes measuring 2 mm, 1.4 mm, and 0.710 mm. Material caught in the 2 mm sieve was sorted into the following categories: wood, bone, contaminants (modern plant material, rocks, twigs, et cetera), nutshell, corn, and seeds. Contaminant was weighed and set aside. Material in the 1.4 mm sieve from the light fraction was sorted like the 2mm material, but wood, bone and contaminant were not pulled. Material from the heavy fraction in the 1.4 mm sieve was scanned and only seeds were pulled. Material from both fractions filtered into the 0.710 mm sieve and the catch pan below it was only scanned for seeds. The remaining material was weighed and then recorded as residue. Corn was identified as either kernel or cupule. Nutshell and seeds were identified to the greatest extent possible, using both seed identification manuals (citation) and the RLA comparative collection. The combined categories of bean/persimmon, sumpweed/sunflower, and chenopod/amaranth were used when identification to one taxon could not be made due to a lack of distinguishing characteristics. Seeds designated as unidentified did not receive identification, but it is possible that one could be made. This label was used for seeds that have diagnostic characteristics but the reference material needed to identify them was not available. Those in the unidentifiable category were so labeled because of poor preservation, damage, or fragmentation of the seed. Seeds that are categorized as unidentifiable have little to no chance of being identified at a later time. Table 1 gives the common names and taxonomic names of plants identified in the samples from the two sites. Identifications were verified by Dr. Scarry.

Table 1. List of Common and Scientific Names of Taxa Present at each Site (X indicates presence).

Common Name	Scientific Name	Carson Mound Group	Parchman Place
Introduced Crops			
Bean	*Phaseolus vulgaris*	X	X
Corn	*Zea mays*	X	X
Mast			
Acorn	*Quercus* sp.	X	X
Hickory	*Carya* sp.	X	X
Pecan	*Carya illinoensis*	X	X
Native Crops			
Amaranth	*Amaranthus* sp.	X	
Chenopod	*Chenopodium berlandieri*	X	X
Erect Knotweed	*Polygonum erectum*		X
Little Barley	*Hordeum pusillum*		X
Maygrass	*Phalaris caroliniana*	X	X
Squash	*Cucurbita pepo*	X	X
Sumpweed	*Iva annua*		X
Sunflower	*Helianthus annus*		X
Fruits			
Grape	*Vitis* sp.		X
Persimmon	*Diospyros virginiana*	X	X
Sumac	*Rhus* sp.		X
Miscellaneous			
Carpetweed	*Mollugo* sp.	X	
Grass family	Poaceae	X	X
Morning Glory	*Ipomoea* sp.	X	
Purslane	*Portulaca oleracea*	X	
Smartweed	*Polygonum pennslyvanicum*	X	X
Spurge (prob. Copperleaf)	Euphorbiaceae	X	
Wild Legume	Fabaceae	X	

Table 2. Carson Mound Group (labeled C) and Parchman Place (labeled P) Sample and Taxa Weight Data

	C 62	C 85	C 98	C 135	C 241	P 4263	P 4732	P 4742	P 4757	P 4760
Common Name										
Introduced Crops										
Bean					0.22	0.03			0.05	
Corn Cupule	0.23	0.38	0.1	0.08	0.21	0.34	0.12	0.37	0.2	0.18
Corn Kernel	0.21	0.21	0.1	0.04	0.65	0.4	0.22	0.33	1.08	0.43
Mast										
Acorn Nutmeat										
Acorn Shell		0.01			0.02	0.07	0.03	0.01	0.11	0.01
Hickory Nutmeat		0.01								
Hickory Shell	0.09	0.06	0.09	0.03	0.16	0.14	0.07	0.13	0.35	0.14
Thin Shell Hickory or Pecan Nutmeat										
Thin Shell Hickory or Pecan Shell	0.02	0.09	0.02	0.01	0.07		0.02		0.14	
Native Crops										
Chenopod								0.03		
Chenopod/Amaranth										
Knotweed (erect)										
Little Barley										
Maygrass								0.02		
Squash Rind										0.03
Sumpweed										
Sunflower										
Sunflower/Sumpweed										
Fruits										
Grape										
Persimmon		0.02			0.09	0.05	0.02	0.16	0.1	0.04
Sumac										
Miscellaneous										
Bean/Persimmon	0.04				0.05	0.01				
Carpetweed										
Grass family										
Morning Glory		0.01								
Purslane										
Smartweed		0.01								
Spurge (prob. Copperleaf)										
Wild Legume										
Unidentified							0.08			
Unidentified seeds										
Unidentifiable	0.08	0.25	0.03	0.05	0.13	0.17		0.42	0.39	0.06
Unidentifiable embryo										
Unidentifiable seeds								0.01		0.01
Unidentifiable stem										
Wood	1.83	4.66	2.14	1.46	2.12	5.96	2.02	8.92	6.36	10.3
Total Plant Weight:	2.5	5.71	2.48	1.67	3.5	7.14	2.58	10.4	8.73	11.2

Table 3. Carson Mound Group (C) and Parchman Place (P) Sample and Taxa Raw Count Data

	C 62	C 85	C 98	C 135	C 241	P 4263	P 4732	P 4742	P 4757	P 4760
Common Name										
Introduced Crops										
Bean				1	6	2			2	
Corn Cupule	68	32	26	20	54	45	23	99	87	32
Corn Kernel	83	58	44	21	203	87	39	87	474	36
Mast										
Acorn Nutmeat							3			
Acorn Shell	3	10	3		3		6	8	49	3
Hickory Nutmeat		1								
Hickory Shell	30	14	27	6	11	3	9	22	42	18
Thin Shell Hickory or Pecan Nutmeat										
Thin Shell Hickory or Pecan Shell	7	28	5	6	14	2	6	7	90	2
Native Crops										
Chenopod		1				5	2	61		4
Chenopod/Amaranth	1									
Knotweed (erect)						1		24	1	3
Little Barley								4		
Maygrass			1			52	12	45	18	23
Squash Rind			1			1	1	2		2
Sumpweed								1		
Sunflower								2		
Sunflower/Sumpweed							1		1	
Fruits										
Grape							1	1	2	1
Persimmon	3	5			10	4	4	14	4	2
Sumac						1				
Miscellaneous										
Bean/Persimmon	7		5	5	14	2	1		1	
Carpetweed		2								
Grass family		2		1					1	
Morning Glory		1								
Purslane				2						
Smartweed			1		1			1		
Spurge (prob. Copperleaf)				1						
Wild Legume					1					
Unidentified					1		8			
Unidentified seeds					1	3	1			
Unidentifiable	44	124	14	17	105	59	8	190	200	15
Unidentifiable embryo				1						
Unidentifiable seeds				2		1		48	5	13
Unidentifiable Stem						5	1	1	1	1

Table 4. Carson Mound Group (C) and Parchman Place (P) Sample and Taxa Standardized Count Data

Common Name	C 62	C 85	C 98	C 135	C 241	P 4263	P 4732	P 4742	P 4757	P 4760
Introduced Crops										
Bean				0.60	1.61	0.28			0.23	
Corn Cupule	27.2	5.60	10.48	11.98	14.52	6.28	8.91	9.52	9.91	2.86
Corn Kernel	33.2	10.16	17.74	12.57	54.57	12.13	15.12	8.37	53.99	3.21
Mast										
Acorn Nutmeat							1.16			
Acorn Shell	1.2	1.75	1.21		0.81		2.33	0.77	5.58	0.27
Hickory Nutmeat		0.18								
Hickory Shell	12	2.45	10.89	3.59	2.96	0.42	3.49	2.12	4.78	1.61
Thin Shell Hickory or Pecan Nutmeat										
Thin Shell Hickory or Pecan Shell	2.8	4.90	2.02	3.59	3.76	0.28	2.33	0.67	10.25	0.18
Native Crops										
Chenopod		0.18				0.70	0.78	5.87		0.36
Chenopod/Amaranth	0.4									
Little Barley								0.38		
Maygrass			0.40			7.25	4.65	4.33	2.05	2.05
Squash Rind			0.40			0.14	0.39	0.19		0.18
Sumpweed								0.10		
Sunflower								0.19		
Sunflower/Sumpweed							0.39		0.11	
Fruits										
Grape							0.39	0.10	0.23	0.09
Persimmon	1.2	0.88			2.69	0.56	1.55	1.35	0.46	0.18
Sumac						0.1395				
Miscellaneous										
Bean/Persimmon	2.8		2.02	2.99	3.76	0.28	0.39		0.11	
Carpetweed		0.35								
Grass family		0.35		0.60					0.11	
Morning Glory		0.18								
Purslane				1.20						
Smartweed			0.40		0.27			0.10		
Spurge (prob. Copperleaf)				0.60						
Wild Legume					0.27					
Unidentified					0.27		3.10			
Unidentified seeds					0.27	0.42	0.39			
Unidentifiable	17.6	21.72	5.65	10.18	28.23	8.23	3.10	18.27	22.78	1.34
Unidentifiable embryo				0.60						
Unidentifiable seeds				1.20		0.14		4.62	0.57	1.16
Unidentifiable Stem						0.70	0.39	0.10	0.11	0.09

Quantitative Methods

For the purposes of this study, wood is quantified by weight whereas seeds, corn, and nutshell are quantified by both weight and count (Tables 2 and 3 respectively). To prevent exclusion of taxa whose seeds are small and whose weight would not register on the scale used, the comparisons and analyses presented below use count data.

After making identifications in the lab, the count and weight data were compiled into tables. In order to prevent bias, I calculated standardized counts (Table 4). To do this I divided the taxon counts by the total plant weight for each sample (this includes wood weight). This ensures that the data from both sites may be compared because the standardization lessens the impact of bias from inequitable sample size.

In addition to the tables I compiled, C. Margaret Scarry and I performed two correspondence analysis tests on the count data from both sites using Systat 12 statistical software. Correspondence analysis makes it easier to see patterns in data and understand relationships between the variability of a sample and the presence of certain taxa.

Plant Preservation Bias

There are several factors that can lead plants to be inequitably or disproportionately persevered. First, plants may be deposited in various states by the people who process them. Plants that have been ground or mashed leave little behind to be preserved. Moreover, some plants may be consumed in entirety while others have large seeds, shells, or other parts that are removed and discarded before consumption. Such byproducts of food preparation are more apt to be preserved than the edible portions. The context in which plants were deposited also plays a role. The acidic soils of the American South do not preserve plants that are not carbonized because agents of decomposition such as fungi and bacteria flourish in them. Due to the high humidity in the Mississippi Delta plants are rarely preserved due to desiccation. Therefore, carbonization through exposure to fire is the most common method of preservation. The burning episodes that allow plants to be preserved in archaeological contexts can destroy them as well. It should be noted that the plants themselves may not be fit for preservation because of their morphological characteristics such as thickness and size. Plants that are particularly small or particularly thin might lack the integrity to survive the firing process that would allow them to be preserved in southeastern contexts.

Discussion of Taxa

The Carson Mound Group and Parchman Place plant assemblages seem to have much in common in terms of the taxa represented (see Table 1). For the purposes of discussion, I have divided the resources into the following categories for both sites: introduced crops, mast, native crops, fruits, miscellaneous, unidentified, and unidentifiable. There is a broad range of taxa present in the plant assemblages, most of which are represented in relative abundance. The assemblages studied also conform generally to expectations of a Mississippian period assemblage, but do exhibit some interesting characteristics. In the following section, I discuss the plants present in the assemblages. The quantities referred to in the following discussions are all standardized counts as seen in Table 4. This discussion might allow us to better ferret out the role an individual or group of resources might have played.

Introduced Crops

The introduced crops category includes corn and beans. Both corn and beans are non-native to the Southeast, having migrated north from Mesoamerica. Corn was domesticated in or around the Oaxaca area of Mexico during the time of the Olmecs and the Mayas (Piperno 2001). It is believed that corn spread throughout the Americas through trade (Smith 1989). This trade was likely of ideas such as ideas about culture, society, and the cosmological universe as well as goods (Smith 1989; Fritz 1990; Scarry 1993). Archaeological evidence for this appears through iconography of North, Central, and South America involving corn as a ritual food. The earliest evidence for the introduction of corn into the American Southeast occurs sometime around A.D. 1 (Fritz 1990). Corn and beans were often grown together in the same plot of land, commonly with native forms of squash as well. Both crops provided carbohydrates but beans are a good source of protein and low in fat, while corn is starchy and high in sugars. In general, beans are found in sites dating after AD 1300 (Hart and Scarry 1999). Corn is seen as indicative of large scale agriculture and food production and was adopted as a main crop after AD 1000 (Scarry 1993).

Corn remains were identified as either kernels or cupules. Corn kernels were edible and could have been cooked, mashed, or ground while corn cupules (the sockets that hold the kernels on the cob) are a byproduct of processing the plant for consumption. Corn kernels and cupules appear in every sample from both sites. They are also the dominant plant food remains in each sample. Corn has a slightly stronger presence in the Carson Mound Group samples than in the Parchman Place samples (see Table 4).

Calculating corn kernel to corn cupule ratios is one way to assess the amount of edible to inedible corn that is in a sample. Kernel to cupule ratios can be used to determine if corn processing and consumption were happening at different locations at a site (Welch and Scarry 1995). When kernel to cupule ratios are high this suggests that processed corn in the form of kernels was present. Low kernel to cupule ratios indicating a strong presence of corn cupules are expected to occur in areas of a site where processing takes place whereas high ratios occur in areas where corn is being consumed. As Table 5 shows most of the kernel to cupule ratios fall in the 1-1.9 range. There is one sample from Carson Mound Group (Carson 241) and one sample from Parchman Place (Parchman 4757) that have significantly more kernel than cupule. There is also one sample in Parchman Place (Parchman 4747) that falls just below 1, indicating slightly more cupule than kernel. The median for the kernel to cupule ratios from Carson Mound Group and Parchman Place is 1.695, meaning that corn kernels were found in higher abundance than corn cupules.

Table 5. Carson Mound Group and Parchman Place Corn Kernel to Corn Cupule Ratio Data

Sample	Kernel to Cupule Ratio
Carson 62	1.22
Carson 85	1.81
Carson 98	1.69
Carson 135	1.05
Carson 241	3.76
Parchman 4263	1.93
Parchman 4732	1.7
Parchman 4742	0.88
Parchman 4757	5.45
Parchman 4760	1.125

Overall, kernel to cupule ratios at Carson Mound Group and Parchman Place are higher than those normally reported. Welch and Scarry (1995) used kernel to cupule ratios in conjunction with analysis of the ceramic assemblage present to discuss status variation in foodways in the Moundville chiefdom. Out of 22 available ratios from Moundville, six are above 1.0 (Scarry, unpublished lab notes 2012). There are three kernel to cupule ratios that fall around 0.8, all of which come from Moundville proper. The remaining 13 ratios range from 0.14 to 0.5. The Moundville ratios come from a variety of contexts including mounds and residential sites of both high and low status (as discussed in Welch and Scarry 1995). When compared to kernel to cupule ratios from Moundville, we can see that the ratios from Carson Mound Group and Parchman Place are significantly higher. The Carson Mound Group and Parchman Place ratios are suggestive of cooking or consumption rather than primary processing.

Bean appears in two samples from Carson Mound Group (135 and 241) and in two samples from Parchman Place (4263 and 4757). Again, there is a stronger presence of bean based on standardized counts in Carson Mound Group than at Parchman Place (Table 4). It is worth mentioning that the bean/persimmon category has relatively high standardized counts for Carson Mound Group and also appears in four of the five samples (all but 85). There may well be bean in the bean/persimmon but identification is most likely impossible.

Masts

This category includes the shell and meat of acorn, hickory (*Carya* sp.), and thin-shell hickory or pecan (*Carya illinoensis*). Thin-shell hickory and pecan are difficult to distinguish so they have been identified as simply thin-shell hickory/pecan. Each of these three types of mast has different but important characteristics that would have made them attractive to gatherers. Acorns are particularly starchy and a good source of carbohydrates as opposed to the other taxa in this category (Scarry 2003). Hickory and thin-shell hickory/pecan contain both fat and protein. Hickory and thin-shell hickory/pecan would have also provided a high amount of energy (Scarry 2003). Hickory is notoriously difficult to process and was more often than not pounded or ground, shell and all. Depending on when in the process the producer stopped, they could have created a number of things. The longer hickory is pounded, the more of its natural oils are released (Fritz et al. 2001). Once it has been ground into a coarse flour-like substance, it can then be boiled. When the coarse hickory meal or flour is boiled, the hickory oil separates and floats to the top where it can be collected (Fritz et al. 2001). Ethnography has shown hickory oil and hickory meal/flour were widely used cooking ingredients in native populations (Fritz et al. 2001). Unlike hickory, it is much easier to extract the nut meat from pecans. Once cracked, their nutmeats come out freely because their shells are less convoluted.

Nutmeat tends to be an uncommon find in archaeological contexts because nuts' natural oils make it difficult for the meats to survive the firing process that preserves them. A small amount of hickory nutmeat appears in one sample from Carson Mound Group (85). Acorn meat is present in only one sample from Parchman Place (4732).

Nutshell, which is processing debris, is much more common and some form of it is found in all ten samples. Hickory and thin shell hickory/pecan are present in all ten samples while acorn is present in all but one Carson Mound Group sample (135) and all but one Parchman Place sample (4263). Acorn is also the least abundant across all ten samples. Hickory shell tends to be the most abundant nutshell found in the Parchman Place samples whereas at Carson Mound Group the dominant nutshell varies between hickory and thin shell hickory/pecan depending on the sample. In the Carson Mound Group samples, masts of all types are the second most abundant plant resource (with corn being first). In the Parchman Place samples, masts and native crops (discussed below) are for the most part found in comparable quantities.

Native Crops

This category contains both starchy and oily seed crops indigenous to North America sometimes referred to as the Eastern Agricultural Complex. The starchy seed crops are: chenopod, chenopod/amaranth, erect knotweed, little barley, and maygrass (Scarry 1993). The oily seed crops are: sumpweed, sunflower, and squash (Scarry 1993). By the Mississippian period, squash also was commonly used for its flesh or its rind (Scarry 1993). All of the plants in this category are weedy plants that thrive in disturbed soil. This means that the resources in this category grow well in areas around humans and with human interaction and could have been managed with relative ease (Scarry 1993). One issue to address with the assemblages is whether the plants were cultivated at the sites or whether they were gathered from wild or weedy stands. Further analysis is needed to make a determination one way or another. Plants in this category have a long history of utilization in the Southeast. For ease of discussion, squash, starchy seeds, and oily seeds will be discussed separately.

The squash specimens found at both Carson Mound Group and Parchman Place are pieces of rind. In the samples in which it is present, squash occurs in small quantities. It is found in only one Carson Mound Group sample (98) but in all but one Parchman Place sample (4757). Although it appears in more Parchman Place samples it does not have a stronger representation within those samples than it does in the Carson Mound Group sample.

Of all the native crops represented in the samples, specimens of the starchy seed group are the most abundant. A small quantity of chenopod can be found in one Carson Mound Group sample (85). This is also true for maygrass, but it appears in a different sample (98). No other native crops are present in the Carson Mound Group samples.

Starchy seeds occur in some form in every Parchman Place sample with maygrass occurring most often. Maygrass is the most abundant of the native crops and appears in all Parchman Place samples. Recent scholarship on the use of maygrass by Gayle Fritz (2011) suggests that maygrass might have a ceremonial role and may be of more importance to native peoples than archaeologists originally thought. Fritz notes maygrass's high nutritional value as a reason why it was so wide spread as well as the relative ease with which it could be cultivated. Fritz also argues that because of its overabundance at some archaeological sites it could have a ritual connotation as a feasting food.

Erect knotweed and chenopod are present in four of the five Parchman Place samples with knotweed in all but 4732 and chenopod in all but 4757. Both were leafy greens whose leaves and seeds could be eaten (Scarry 2003). Chenopod seeds found from both Carson Mound Group and Parchman Place appear to have come from cultivated or domesticated forms with very few wild seed specimens. The cultivated status of the chenopod specimens needs to be confirmed with a detailed inspection of shapes and measurements using a Scanning Electron Microscope (SEM). There is also a chenopod/amaranth category. While chenopod and amaranth are both starchy native seeds, in the Southeast chenopod was most commonly used for its seeds only while amaranth may have been gathered mostly as a leafy green (Scarry 2003). Both erect knotweed and chenopod appear in greater standardized counts in one particular Parchman Place sample (4742) as indicated in Table 4; this is also the only sample in which little barley occurs albeit in low quantity.

The oily seeds, sumpweed and sunflower, only appear in one sample, Parchman Place sample 4742. Due to morphological similarities in the seeds there is also a sumpweed/sunflower category that consists of partial seeds that cannot be definitively identified to genus. Specimens in this category are also found exclusively in the Parchman Place samples and only in two of those samples (4732 and 4757). Because sumpweed and sunflower are high in protein and fat (through their oily content) they were most likely used like hickory and pecan.

Fruits

Plant resources that fall within this category are: grape, persimmon, and sumac. These were all wild resources that could have been managed in some way. All three taxa were used to make some sort of drink but were also used for their flesh. Persimmon is reported to have been used to make a form of bread. Persimmon is present in three samples from Carson Mound Group (62, 85, and 241) and is the only fruit found in the Carson Mound Group samples. Persimmon appears in every Parchman Place sample. Persimmon specimens appear in similar quantities in Parchman Place samples as the starchy native seed crops. Wild grape appears in four of the five samples (4760, 4742, 4732, and 4757), but with some of the lowest standardized counts of any plant resource that appears in the Parchman Place samples (see Table 4). Sumac is present in only one sample, Parchman 4263.

Miscellaneous

Plants placed in this category do not fit into other categories. These resources include: carpetweed, assorted grasses, morning glory, purslane, smartweed, spurge, wild legume, and the combined designations of bean/persimmon and chenopod/amaranth. The grasses were identified as "grass family" because preservation prevented a greater degree of identification. This is also true for the "bean/persimmon" and "chenopod/amaranth" designations—these were put into the miscellaneous category because identification to one taxon could not be made. Unlike the "sumpweed/sunflower" category where both sumpweed and sunflower are oily native seed crops, the "bean/persimmon" category contains two taxa that would have been utilized in different nutritional ways. Some of the plants in the miscellaneous category have known non-food uses like morning glory which was occasionally used medicinally or ceremonially. Other inedible taxa like the grasses may have been accidental inclusions.

Discussion of Data

Below are my initial observations regarding the assemblages both individually and comparatively. These observations rely on the standardized count data found in Table 4 and are focused on the research questions I posed in the introduction—what plants were being used at each site, are there any intra- and inter-site differences and what are they, and how do subsistence practices at the sites compare to regional Mississippian expectations. Following these observations will be a discussion of the results of the Correspondence Analyses.

Carson Mound Group

My preliminary observations concerning Carson Mound Group were that the overall composition of the five samples seemed consistent with one another and that there were very few specimens from the native crops found in these samples. Corn was the most common taxon found, and there was a relatively high ratio of kernel to cupule. Masts were the second most common taxon found at Carson Mound Group. Hickory, thin shell hickory/pecan, and acorn are all present, with either hickory or thin shell hickory/pecan most abundant depending on the sample. Both bean and persimmon are found in some of the samples but not all. All but one sample has a significant amount of bean/persimmon (sample 85). As mentioned above, the bean/persimmon category was implemented because persimmon and bean seeds are similar in both size and texture. When fragments of bean and persimmon seeds are present in a sample it can be difficult to tell them apart when they lack diagnostic characteristics such as attachment scars. Many of the specimens that were put into the “miscellaneous” category are found in the

Carson Mound Group samples. It is interesting to note that this is the one area of diversity in the Carson Mound Group samples.

Parchman Place

When looking at data from the Parchman Place samples, it is easy to see that there is a strong corn presence and relatively high kernel to cupule ratio as there is at Carson Mound Group. There is also a moderate nut mast presence with hickory having the greatest representation. The Parchman Place assemblage differs from Carson Mound Group in the representation of fruit and native cultigens. All Parchman Place samples contain some sort of fleshy fruit, with persimmon being the most common. The same is true for the native crops—they appear in each of the five samples with maygrass having the second highest standardized count data for all taxa (corn being the highest). In terms of consistency, the same plant resources can be found in most of the samples but the degree to which they are represented varies depending on the individual sample. One of the samples, Parchman 4742, not only contains the highest chenopod standardized count but also has all of the resources considered part of the Eastern Agricultural Complex (EAC): maygrass, chenopod, little barley, erect knotweed, sumpweed, and sunflower.

Comparison of the Sites

Across all ten samples from Carson Mound Group and Parchman Place there is an abundance of corn. Corn is also the dominant plant resource in every sample. Masts, in particular hickory and thin shell hickory/pecan nutshell are common in all ten samples. Acorn tends to be the least abundant mast, appearing ubiquitously in the Carson Mound Group samples. Samples from both sites also demonstrate a strong presence of hickory.

However, hickory and thin shell hickory/pecan standardized counts (see Table 4) are higher in the Carson Mound Group samples than in the Parchman Place samples. Given that Carson Mound Group and Parchman Place are approximately 15 miles (or less than a day's walk on foot) differences between the samples were unexpected.

As mentioned above Carson Mound Group has fewer taxa and a much greater degree of consistency within its samples than Parchman Place. When examining a list of all taxa found in the ten samples there is a great degree of diversity present. This diversity is unevenly distributed between the sites. For the most part, samples from Carson Mound Group were full of corn with hickory, thin shell hickory and acorn mixed in; persimmon was occasionally present in low quantities. The samples from Carson Mound Group display consistency through having not only the same set of resources present in each sample but also in that they are found to the same degree in each sample. Parchman Place has more diversity but it is unevenly divided between samples. One sample in particular, Parchman 4742, contains the greatest diversity of plant resources of all ten samples.

Correspondence Analysis

In order to better understand the relationships between the presence of certain plant resources and diversity within and among the samples two correspondence analyses (CA) were run. Correspondence analysis is a multi-variate statistical analysis that creates graphs illustrating patterns of associations between entries in contingency tables. To complete the first CA, counts for the plants represented in each sample from Carson Mound Group and Parchman Place were used. For the second CA, only selected plant taxa were used (see below). After creating the contingency tables, the mathematical relationships between elements in the table (in this case between the number of specimen of a given taxon present in a sample and the samples themselves) are calculated and then graphed along two dimensions. The points on the graph represent both taxa and samples. The relationships between where two points are on the graph illustrates their mathematical relationship. Plotting data points on the biplot graph enables one to perceive relationships or associations between elements more clearly. For our purposes this allows us to see a few things: whether there are inter- and intra-site differences, how great inter- and intra-site differences are, and what elements are contributing to inter- and intra-site differences.

Scarry and I ran two different Correspondence Analyses. We first ran a CA that included all identified taxa in the samples but found that the results of this test were difficult to interpret because of the large number of variables used (see Figures 5a and 5b; Tables 6a and 6b for coordinates). We then eliminated those taxa which fell into the miscellaneous category and were generally represented in very low numbers often in a single sample and ran a second CA. The results of this analysis give a cleaner, better view of what is going on within and between the Parchman Place and Carson Mound Group samples. Therefore this is the CA that will be used for interpretation (Figures 6a and 6b; see Tables 7a and 7b for coordinates).

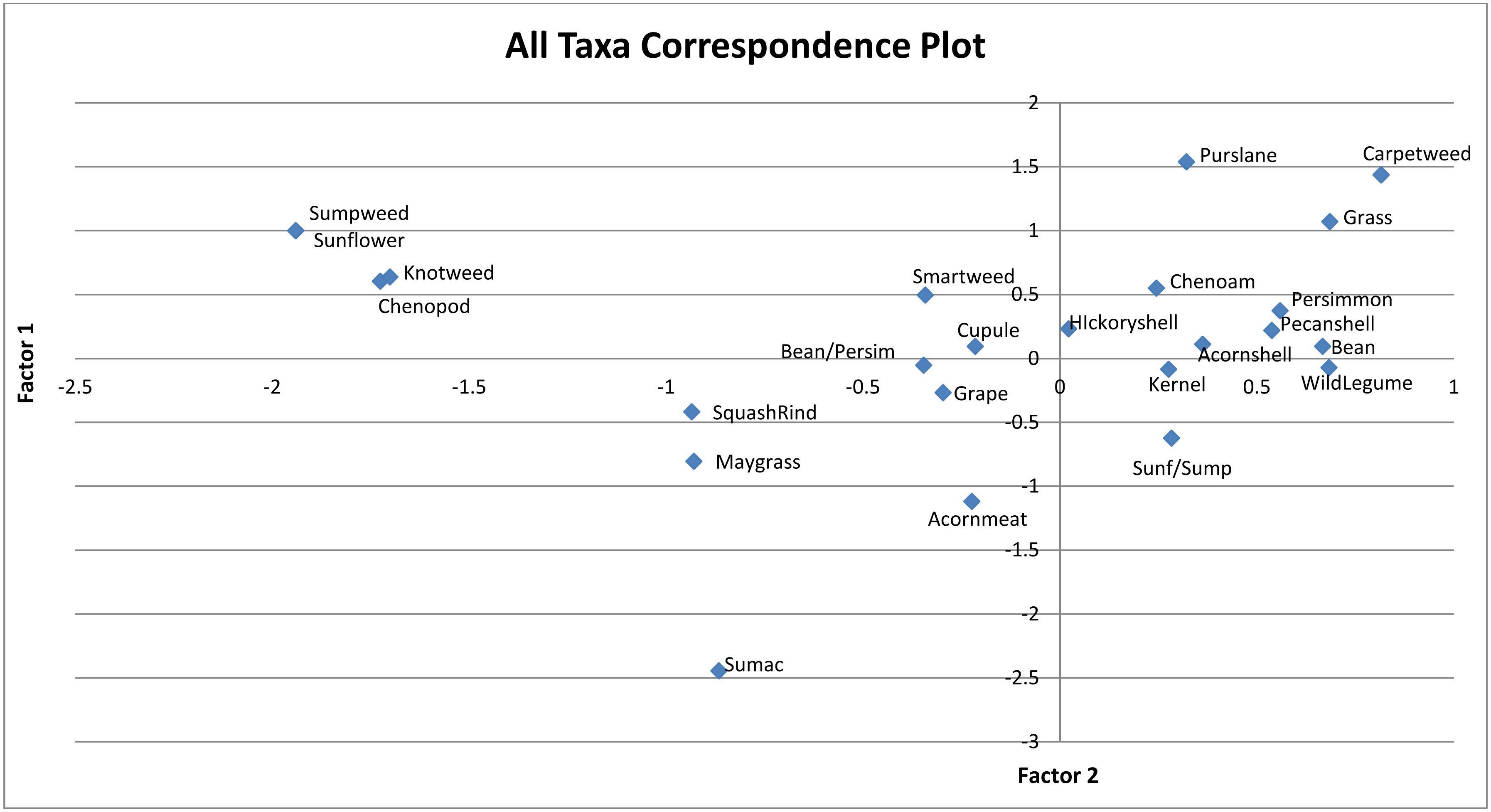

Figure 5a. Original Correspondence Analysis graph showing all identified taxa present in Carson Mound Group and Parchman Place.

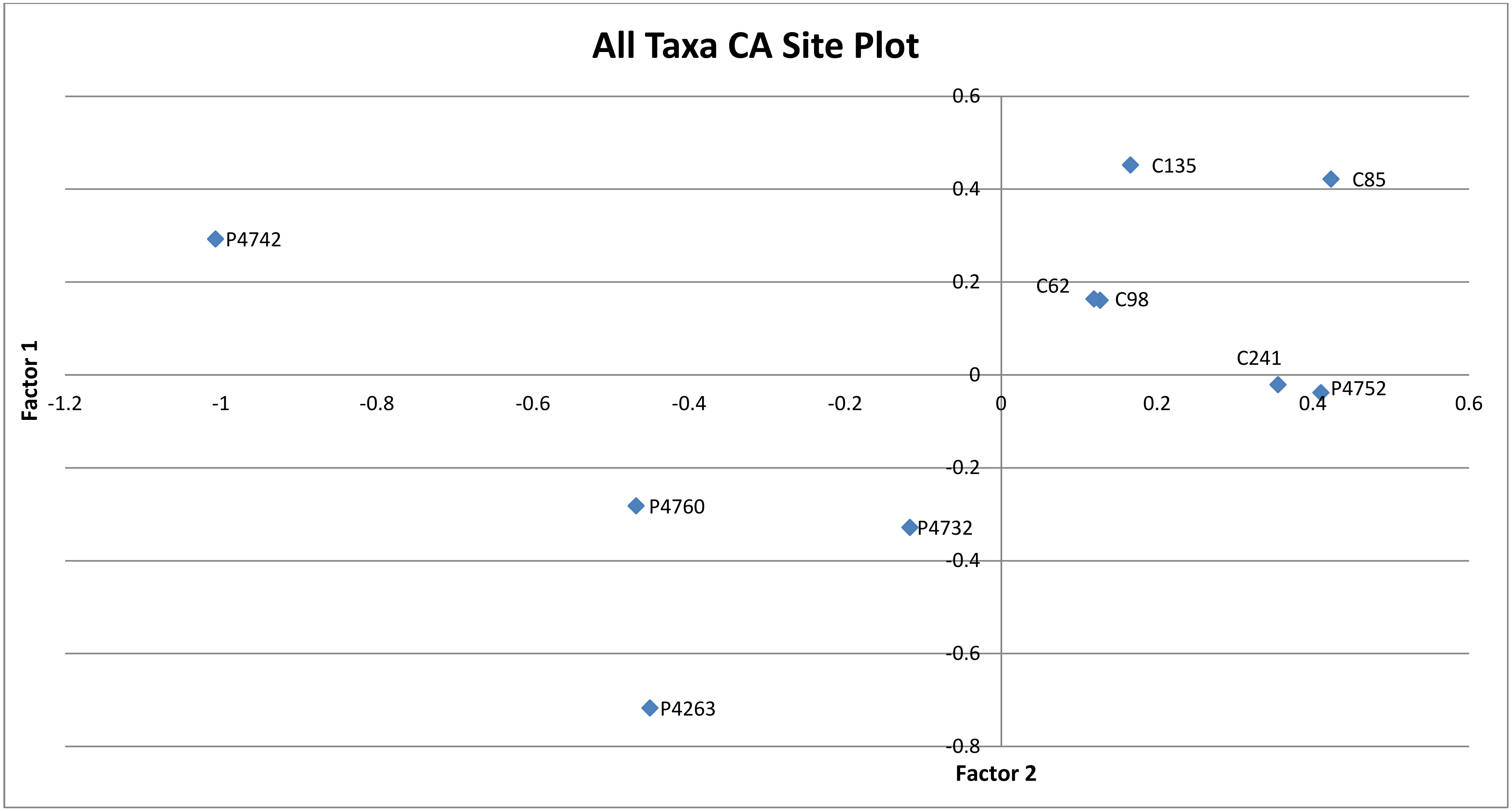

Figure 5b. Original Correspondence Analysis graph showing all samples from Carson Mound Group and Parchman Place

Table 6a. Coordinates of Taxa graphed in Original Correspondence Analysis (Figure 5a)

	Factor 1	Factor 2
Acornmeat	-0.224	-1.118
Acornshell	0.362	0.111
Bean	0.667	0.095
Bean/Persim	-0.346	-0.054
Carpetweed	0.815	1.437
Chenoam	0.245	0.55
Chenopod	-1.725	0.604
Cupule	-0.215	0.094
Grape	-0.297	-0.268
Grass	0.685	1.071
Hickorymeat	0.815	1.437
Hickoryshell	0.022	0.231
Kernel	0.276	-0.084
Knotweed	-1.701	0.638
LittleBarley	-1.94	0.999
Maygrass	-0.929	-0.804
MorningGlory	0.815	1.437
Pecanshell	0.538	0.22
Persimmon	0.559	0.374
Purslane	0.321	1.54
Smartweed	-0.342	0.496
Spurge	0.321	1.54
SquashRind	-0.935	-0.418
Sumac	-0.866	-2.445
Sumpweed	-1.94	0.999
Sunflower	-1.94	0.999
Sunf/Sump	0.283	-0.624
WildLegume	0.683	-0.071

Table 6b. Coordinates of Sites graphed in Original Correspondence Analysis (Figure 5b)

	Factor 1	Factor 2
C135	0.166	0.452
C241	0.355	-0.021
C62	0.127	0.161
C85	0.423	0.422
C98	0.119	0.164
P4263	-0.45	-0.717
P4732	-0.117	-0.328
P4742	-1.007	0.293
P4752	0.41	-0.038
P4760	-0.468	-0.282

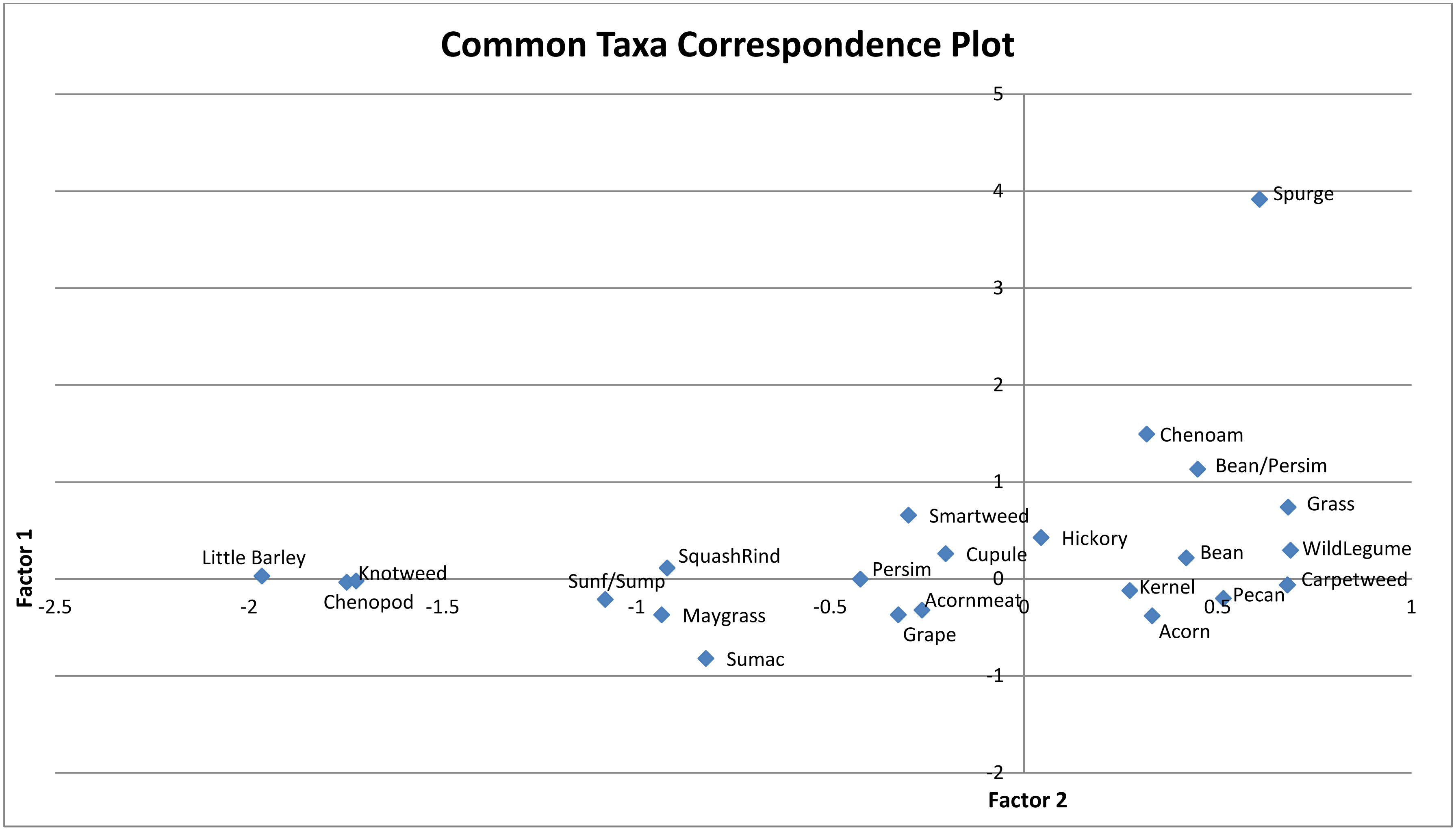

Figure 6a. Second Correspondence Analysis graphs showing only common taxa present in Carson Mound Group and Parchman Place.

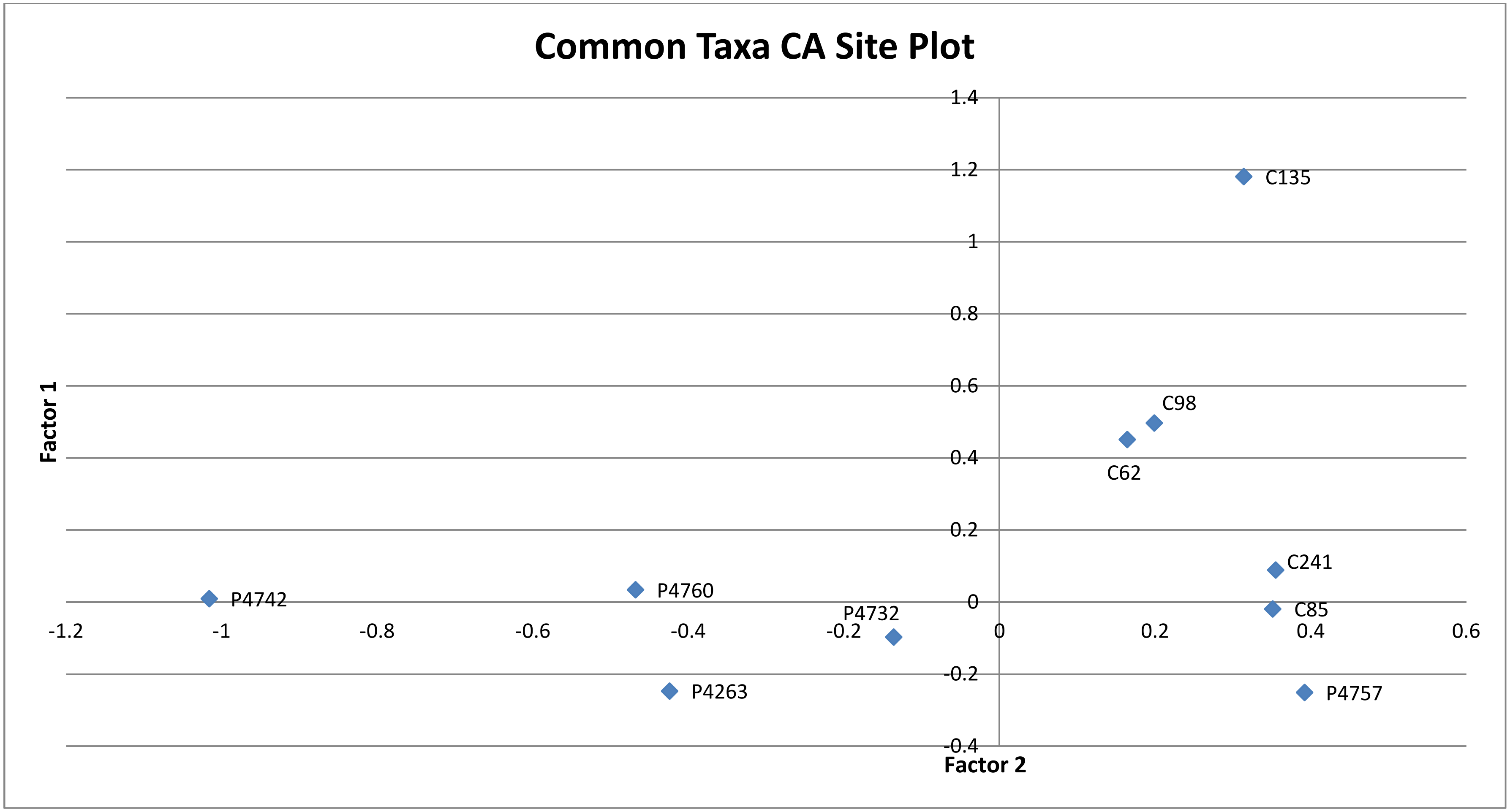

Figure 6b. Common Taxa Correspondence Analysis showing all samples from Carson Mound Group and Parchman Place

Table 7a. Coordinates of Taxa graphed in Common Taxa Correspondence Analysis (Figure 6a)

	Factor 1	Factor 2
Acorn	0.331	-0.381
Acornmeat	-0.263	-0.321
Bean	0.419	0.217
Bean/Persimmon	0.448	1.132
Carpetweed	0.68	-0.062
Chenoam	0.317	1.495
Chenopod	-1.748	-0.035
Cupule	-0.202	0.261
Grape	-0.324	-0.368
Grass	0.682	0.74
Hickory	0.044	0.427
Hickorymeat	0.68	-0.062
Kernel	0.273	-0.12
Knotweed	-1.724	-0.02
LittleBarley	-1.967	0.03
Maygrass	-0.935	-0.37
MorningGlory	0.68	-0.062
Pecan	0.515	-0.2
Persimmon	-0.422	-0.002
Purslane	0.608	3.916
Smartweed	-0.298	0.658
Spurge	0.608	3.916
SquashRind	-0.921	0.114
Sumac	-0.821	-0.821
Sunflower/Sumpweed	-1.081	-0.212
WildLegume	0.688	0.296

Table 7b. Coordinates of Sites in Common Taxa Correspondence Analysis (Figure 6b)

	Factor 1	Factor 2
C135	0.314	1.181
C241	0.355	0.089
C62	0.164	0.451
C85	0.351	-0.019
C98	0.199	0.497
P4263	-0.424	-0.247
P4732	-0.136	-0.097
P4742	-1.016	0.009
P4757	0.392	-0.251
P4760	-0.468	0.034

On the graphs in Figures 5a and 5b and 6a and 6b the x-axis represents Factor 1; the y-axis represents Factor 2. Factor 1 accounts for the greatest deviation from the null hypothesis of no association and Factor 2 accounts for the second greatest deviation. Data points are plotted as (Factor 1, Factor 2) on the biplots. For the CA in Figures 6a and 6b, the two factors together account for 65.2% of the variation within the assemblages. In order to see patterns of association, data points representing taxa and samples are plotted on the same graph. For ease of interpretation I have pulled the sample data points onto a separate graph (Figure 6b). When all of the data points are located on the same graph it is far too cluttered to make out relationships between taxa and samples. Separating the variables makes comparison between the points easier.

The Correspondence Analysis (Figures 6a and 6b; Table 7a and 7b) seems to reinforce my observations of the Carson Mound Group and Parchman Place assemblages made on the basis of the standardized counts (Table 4). For the most part samples from Carson Mound Group and Parchman Place fall on opposite sides of the x and y-axes. There is one exception to this, Parchman 4757. According to the CA, what differentiates the Carson Mound Group samples and Parchman 4757 from the remaining Parchman Place samples are the prevalent plant resources at Carson Mound Group: corn kernel, hickory nutshell and nutmeat, bean, bean/persimmon, pecan, and acorn. These taxa are plotted in the lower right or positive x, negative y quadrant of the graph. This means that squash rind, maygrass, chenopod, sunflower/sumpwood, and persimmon determined which side of Factor 1 (the x-axis) the four Parchman Place samples fell. This result confirms my observation of the stronger presence of EAC crops in the Parchman Place samples. Likewise the abundance of corn kernel and mast in Carson Mound Group are the two key differences between Carson Mound Group and Parchman Place.

Intra-site differences can be seen through whether taxa and samples fall above or below the x-axis. Four of the Parchman Place samples (4760, 4732, 4263, and 4742) are relatively tightly clustered based on negative values for the first factor (x-axis). The last Parchman Place sample (4757) has a positive value and clusters with two Carson Mound Group samples (85 and 241). This last Parchman Place sample, Parchman 4757, was plotted in association with acorn and pecan. According to the standardized count table (Table 4), Parchman sample 4757 has significantly higher nutshell counts than the other Parchman Place samples, but its pecan and acorn counts are the highest out of all ten samples. It appears that high mast counts, in particular acorn and pecan, separate this sample for the other Parchman Place samples. The remaining Carson Mound Group samples are clustered tightly (virtually on top of each other) just below the (0, 1) mark on the graph and between 0 and 1 on the x-axis. The bean/persimmon category is plotted above the area as the Carson Mound Group cluster. Referring back to the standardized count table, these three samples have moderately high standardized count of bean/persimmon (Table 4). Hickory standardized counts in two of these samples are over 10 (Carson 62 and Carson 98). Hickory is plotted just off the y-axis (Factor 2) in the positive x-axis (Factor 1). The strong presence of hickory and bean/persimmon seem to be differentiating these samples from the others in Carson Mound Group. Taking the results of the CA into consideration it appears that the presence of EAC crops in Parchman Place and the presence of corn kernel, bean/persimmon, bean, hickory nutmeat, thin shell hickory/pecan and acorn in Carson Mound Group are the difference between the two.

Due to time constraints, I was limited to analyzing 10 samples in total. If I had greater sample size I might be able to pinpoint with a greater degree of certainty what is causing the perceived differences in plant resource utilization at Parchman Place and Carson Mound Group. There appear to be no factors such as environmental differences (they are within the same region) or population pressure that would cause the two sites to practice different subsistence methods. If it is not environmental, it might be that the samples from Carson Mound Group are contextually different from those from Parchman Place. As mentioned previously, the Carson Mound Group samples come from pits within a prehistoric palisade that encloses Mound A, its associated mounds (Mound E), a large habitation area, and a number of burials. These pits frepresent discrete, singular events in time. It is not known whether these pits are associated with houses, structures or burials; it is unknown if the samples are strictly domesticate refuse from possible elite context or ritual refuse from possible elite or mortuary activities. The Parchman Place samples all come from strata within a refuse mound adjacent to a "neighborhood" or non-elite habitation. It is thought that all material from this trench is in fact household debris possibly mounded during a ritual process. Since the mounded refuse at Parchman is thought to be deposited as a result of ritual cleaning, samples may represent non-ritual food use from as much as a year (there is a chance a longer period is represented if storage pits or containers were emptied during this process). Due to the refuse mound's close proximity to the habitation area (see Figure 4) it is believed that the two are associated.

Contextual differences of the pits at Carson Mound Group and Parchman Place lead to the question of who deposited or used the specimens found in the samples from each site. It is difficult to believe that given the closeness of Parchman Place and Carson Mound Group the differences in the plants present at each site would translate into a difference in community-wide subsistence practices. If the palisaded area of Carson Mound Group represents some sort of restriction and the residences within this area are elite, with the occupation outside the palisade being non-elite, then it is possible to see the plant resources deposited there as derived from elite activities. The same logic can be applied to Parchman Place; if we accept that the habitation area is non-elite and the mounded refuse is from that area, then what was found in the refuse derives from non-elite activities. Therefore the differences displayed in an examination of plant material from each of them could be interpreted as being two different components of the same subsistence strategy, with the elite activities at Carson Mound Group putting more focus on corn and non-elite activities at Parchman Place featuring a more diverse use of crops.

The samples could also be interpreted as representing domestic and ritual refuse. If the area of Carson Mound Group investigated was a necropolis, it is possible that the pits sampled contained waste from feasting or other funerary rituals. As aforementioned, the pits at Carson Mound Group are single, discrete depositional events. The samples from Carson represent a single moment in time. It is interesting to note that the Carson Mound Group sample associated with a burial, Carson 98, displays no significant differences from the other, non-burial samples. Carson 98 is associated with secondary burials. Secondary burials are by their nature purposeful deposits. Because of the nature of its associated burial, it is not unreasonable to say that Carson 98 was also a purposeful deposition. If the other pits are associated with mortuary ritual, then it seems that there is an emphasis on corn and nuts as the appropriate food for consumption on such occasions.

If Stevens Nelson is correct in her interpretation of the mounded area at Parchman Place, then the samples investigated could have also been waste from feasting or other ritual episodes, but the activities resulted in deposition of a different range of food debris than did those at Carson Mound Group. One such ritual could have been a cleansing ritual known ethnographically as the Green Corn Ceremony. The Green Corn Ceremony was a multiday ritual that took place at the beginning of the new harvest season (Hudson 1984). In essence the Green Corn Ceremony is about social, spiritual, and community renewal for the upcoming year (Hudson 1984). Large feasts and community wide cleaning were components of this ritual, either of which could explain Stevens Nelson's mounded fill (Stevens Nelson, personal communication 2012; Hudson 1984). If Stevens Nelson's theory is correct, the Parchman Place samples represent plant utilization throughout the year. These samples are the result of the deposition of the accumulation of carbonized remains and possibly leftover stored plant materials from a year's time.

Comparison to Mississippian Trends

When comparing my findings at Carson Mound Group and Parchman Place to the Mississippian-era Central Mississippi River Valley subsistence patterns laid out by Fritz (2000) and Scarry (1993), I will treat the assemblage as one unit. Carson Mound Group demonstrates a prominence of corn with some mast and fruits mixed in. Quantities of EAC crops are higher farther north in the valley, but the quantities at Parchman Place nonetheless show some degree of reliance on these crops at that site. The findings of EAC crops mask the relative prominence of corn within the Parchman Place samples. The peoples at Parchman Place seem to be utilizing native crops alongside corn and hickory. This indicates that the peoples at Parchman Place continued to utilize the native crops while participating in the same general subsistence strategy of heavy corn agriculture and mast gathering that seems to fit the samples from Carson Mound Group. This means that the overall assemblage contains a strong corn presence with masts, EAC crops and fruits in relatively equal representation as secondary crops.

As discussed above, Fritz (2000) finds the people in the Central Mississippi River Valley relied intensely on native crops until A.D. 1400. At A.D. 1400 most native crops (sunflower excluded) declined visibly in the archaeological record. During the Late Mississippian (after A.D. 1400) corn was the most heavily used crop in the area with native crops and masts taking a secondary role. In general the assemblage from Carson Mound Group and Parchman Place seems to align with Fritz's trend. If Carson Mound Group and Parchman Place are examined separately, Parchman Place would be identified as most closely fitting Fritz's pattern.

Scarry (1993) finds similar trends as Fritz (2000) in the Arkansas Lowlands. Like Fritz's (2000) findings in the Central Mississippi River Valley, Scarry (1993) finds that people in the Arkansas Lowlands heavily used native crops until A.D. 1100. After A.D. 1100, the peoples of the Arkansas Lowlands began to intensively farm corn and the use of EAC crops declined. Scarry does not rule out a mixed crop strategy in some areas, but affirms that corn was the dominant crop. The Carson Mound Group and Parchman Place assemblage also fits Scarry's subsistence patterns.

In order to improve our understanding of how the Carson Mound Group and Parchman Place assemblage fits into Central Mississippi River Valley subsistence patterns during the Late Mississippian period I decided to compare the assemblage to two Late Mississippian sites within the region. For this comparison I selected Rock Levee (Weinstein et al 1995) and Parkin (Scarry 1998) because of their close proximity to Carson Mound Group and Parchman Place and the ready availability of information about the sites.

Rock Levee is located outside of Beluah, Mississippi. It is approximately 45 miles south of Parchman Place and lies halfway between Parchman Place and the Green Line. Rock Levee was dated using Lower Mississippi River Valley ceramic typologies (Weinstein et al 1995). Pits from Rock Levee contained ceramics from the late Marksville period (A.D. 200-350) and the early Baytown period (A.D. 350-600) that may have been filled during the late Baytown Period (A.D. 600-800) (Weinstein et al 1995). Other pits at Rock Levee containing Marksville and Baytown pottery had late Coles Creek ceramics at the bottom, indicating that these pits were most likely filled during late Coles Creek (A.D. 1000-1200) at the earliest (Weinstein et al 1995). The late Mississippian period component, our period of interest, was limited to two pits.

Unfortunately even though Rock Levee is relatively close to Parchman Place and Carson Mound Group, it seems the bulk of Rock Levee's occupation occurs earlier than when this study is dated to. The ethnobotanical data Weinstein et al (1995) published from the late Mississippian-era component of Rock Levee shows that no native crops were found. The bulk of plant material identified is corn with some mast (hickory and acorn mostly). Given that the late Mississippian subsistence data from Rock Levee is limited it is difficult to make a comparison to the assemblage from Carson Mound Group and Parchman Place. The lack of native crops at Rock Levee during the late Mississippian period may suggest a switch from heavy reliance on EAC crops to intensive corn agriculture supplemented by mast gathering. If the two late Mississippian period pits at Rock Levee are characteristic of the subsistence strategies in use at Rock Levee then Rock Levee would fit better with trends that Fritz (2000) describes for the Lower Mississippi River Valley.

Parkin is located approximately 90 miles northwest of Parchman Place and Carson Mound Group in Cross County, Arkansas (Scarry 1998). Parkin has both middle and late Mississippian period occupation components. Much like Carson Mound Group, Parkin was occupied in different locations during different time periods. Scarry (1998)'s examination of the plant material from Parkin found that during the middle Mississippian period the people at Parkin were relying heavily on corn agriculture supplemented by mast gathering. During the late Mississippian period heavy reliance on corn continued but the representation of native crops increased. It appears that the subsistence strategies at Parkin during the late Mississippian period are comparable to the Carson Mound Group and Parchman Place assemblage. Both systems feature corn prominently with masts, bean, and native crops utilized to varying degrees as secondary crops and fit well with regional subsistence expectations laid out by Fritz (2000) and Scarry (1993).

It is difficult to compare the middle Mississippian component at Parkin to the Carson Mound Group and Parchman Place assemblage as middle Mississippian is not well defined at either of the latter two (see Lansdell 2009; James 2010). It is possible that middle Mississippian at Carson Mound Group and Parchman Place featured heavy corn agriculture and a de-emphasis on native crops similar to Parkin but further investigation is required to confirm this. Fritz (2000) discusses how corn was rapidly intensified in the Central Mississippi Valley while native crops except sunflower were used to a significantly lesser degree. It could be that native crops maintained significance in the early Mississippian period during the intensification of corn, dropped off in the middle Mississippian when corn was established as the dominant crop, and picked back up in the late Mississippian and Protohistoric periods when shifts in populations and site use occurred.

Conclusions

An examination of flotation samples taken from two sites, Carson Mound Group and Parchman Place, located within the Upper Yazoo River Basin of the Mississippi River Valley hint at the variable degree to which native peoples adopted regional Mississippian subsistence practices in the time before contact. More importantly the samples seem to say something about how plant use might differ in residential and ritual contexts. Samples from Carson Mound Group and Parchman Place are strikingly dissimilar from each other in a few ways. There is a stronger representation of corn and nutshell (especially hickory) at Carson Mound Group. Parchman Place seems to have had a greater reliance on native crops indicated by findings of chenopod, maygrass, sumpweed, sunflower, knotweed, and little barley.

If my findings hold true, Parchman Place and Carson Mound Group's differences may be attributable to several factors: chronological differences, social status differences, ritual differences, and environmental differences. Although Carson Mound Group and

Parchman Place were both occupied during the late Mississippian period, this does not necessarily mean that they were contemporaneous. The late Mississippian period spans several centuries, during which the sites could have fallen in and out of use. While there is at least one radiocarbon date for Parchman Place (see Stevens 2006), to my knowledge there are no radiocarbon dates for Carson Mound Group. Both sites were primarily dated using ceramic seriation. Because of the nature of ceramic seriation (and relative dating in general) it is difficult to say with certainty that the sites were in use at the same time. I do not believe that chronology is a factor in the subsistence differences found at Carson Mound Group and Parchman Place because both sites were noted as occupied historically; Carson Mound Group has been one of the many possible candidates for de Soto's crossing point (James 2010; Landsell 2009; Stevens 2006).

There is likely a status difference between the people who were using Carson Mound Group and those who were living in Neighborhood 1 at Parchman Place. It is probable that the area of investigation at Carson Mound Group was used by elites and that the people living in Neighborhood 1 (Figure 4) of Parchman Place were non-elites. There is known status variation in foodways for the Mississippian-era (Welch and Scarry 1995). Welch and Scarry (1995) used corn kernel to cupule ratios and distribution of ranked ceramic types to determine that there was status based variation in foodways at Moundville. If the differences observed are due to status based variation then the pattern is that places of higher status have above median ratios whereas places of low status have median or below median ratios.

It is more likely that both differences in status and also differences in the ritual activities which deposited the remains account for variations in plant utilization between

Carson Mound Group and Parchman Place. At Carson Mound Group, the plant remains were found recovered from a cordoned off area near the main ceremonial mound that has produced a large number of secondary burials. One Carson Mound Group sample, Carson 98, was found in association with one of these secondary burial deposits. According to James (2010), during the late Mississippian Carson Mound Group was most likely being used as a necropolis. The pits from which the Carson Mound Group samples were collected may contain refuse associated with rituals that accompanied the reburial of human remains. This sort of activity can also be seen at the end of the use life of Moundville (Steponaitis 1998). Moundville, like Carson Mound Group, was a large site that was intensively occupied before being transformed into a necropolis. According to Steponaitis (1998), the descendants of the elites who originally occupied Moundville returned to the site often to bury their dead there and maintain their ancestral ties to Moundville (which was possibly a source of elite power). This may have been the case at Carson Mound Group also. It may have been that elites living at Parchman Place were the ones responsible for pits found at Carson Mound Group; however more work needs to be done before this could be confirmed. The samples from Parchman Place were likely deposited in the mounded refuse from which they were excavated by a cleaning out ritual such as the Green Corn Ceremony. This type of ceremony is one in which all people in the community, regardless of status would have participated (Hudson 1985). If they were deposited due to this ritual, plant remains recovered from Parchman Place represent plant utilization over an entire year, instead of during one specific event. This means that although the samples come from a ritual context, the Parchman Place plant remains are likely those of year round domestic refuse.

The temporal differences in how the Carson Mound Group and Parchman Place samples were generated masks the importance of why they were generated. The plant remains in samples from Carson Mound Group were carried there for a specific purpose at one specific point in time. The plants found at Carson Mound Group were likely deliberately brought there for whatever burial associated or non-associated ritual was taking place. While the samples at Parchman Place come from a ritual deposition, the plant remains themselves are not ritual but household refuse. The plants being used at Parchman Place were not deliberately selected for use in a ceremony or ritual, but they were everyday food resources.

The societies at Carson Mound Group and Parchman Place are likely more complex that elite and non-elite. How status is designated within societies can result from age, gender, wealth, ancestry, marital status, prestige, or a myriad of other factors. The social differences between rituals and the people participating in those rituals might be ones we cannot perceive with such a narrow window into the past. Because archaeology relies on material evidence we are not always able to perceive the intangible and often times nebulous processes behind the deposition of the remains we study. Even with a larger sample size, multiple lines of archaeological evidence (such as ceramic analyses) are needed to help clarify the social differences that seem to be responsible for the differential plant use found at Carson Mound Group and Parchman Place.

Due to the sites close proximity to each other it is unlikely that environmental differences had any role in the variation in plant utilization found at Carson Mound Group and Parchman Place. I propose instead the plant remains from Carson Mound Group and Parchman Place represent two facets of the same subsistence strategy where the assemblage from Parchman Place represents everyday plant utilization for non-elites (and probably most elites as well) and Carson Mound Group represents plant utilization during ritual or special use occasions. This has greater implications towards our ideas of broader regional Mississippian subsistence patterns. Given that Parchman Place and Carson Mound Group are no more than a day's walk from each other it is likely that they had some sort of interaction. This suggests the possibility of a relationship between the two sites, which while it has been hinted at by some, has yet to be fully understood. Differences in plant utilization between two "sister" sites and ultimately the regional patterns placed on them by researchers should lead us to reconsider how Mississippian played out in the Upper Yazoo. Hopefully further research conducted on Carson Mound Group and Parchman Place will help to delineate Mississippian subsistence practices within the Upper Yazoo Basin.

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