Subsistence and Ritual: Paleobotany at the Smith Creek Site

Alexandria Mitchem

This paper examines the paleobotanical samples from the Smith Creek Archaeological Project. The paper will outline the history of excavations at Smith Creek and what they have shown about the site chronology. Additionally, the paper will review both the general and paleobotanical excavation methods, as well as the paleobotanical recovery procedures. Finally, the paper will present the plant materials found at Smith Creek and discuss two of the site's more unusual finds. In conclusion, this paper will argue that Smith Creek's botanical samples show a site with normal subsistence patterns, that spans multiple time periods, and in addition, has evidence for ritual activity.

Excavations at Smith Creek

Smith Creek Survey History

The Smith Creek site is located in Wilkinson County, Mississippi on the bluff edge overlooking the Mississippi River floodplain. It consists of three mounds A, B, and C, dating to the Coles Creek period surrounding an open plaza, which is typical of Coles Creek sites (Figure 1).

Recently, in 2013, Mounds A and C and the eastern edge of the plaza were investigated as part of the Mississippi Mound Trail by the University of North Carolina, Chapel Hill. These various surface collections and initial excavations indicated that the site was rich in pottery and organic materials (Kassabaum, Steponaitis, and Melton 2014). From the pottery types uncovered in these excavations and a series of radiocarbon dates from the Mississippi Mound Trail Project, the site was assumed to be primarily Coles Creek. Excavations in 2015 in Mounds A and C further confirmed this date and 2013 and 2015 excavations in eastern and southern plaza were found to contain mixed Coles Creek and Plaquemine deposits.

2015 Field Season

2015 was the first season for the University of Pennsylvania's Smith Creek Archaeological Project. A unit was opened half way up the eastern slope of Mound A, 1046R466, and the western slope of Mound C, 1077R625. Two contiguous units, 989R546 and 991R546, were opened in the southern portion of the plaza. The goals of these excavations were to determine more about the nature of the society during the Coles Creek period, which could then be applied to answering larger questions about how social structure and subsistence changed from the periods surrounding it.

General Conclusions: Site Chronology

During the 2015 season, the mounds were confirmed to be Coles Creek, due to stylistic dating of pottery and, in the case of Mound A, Accelerator Mass Spectrometry (AMS) radiocarbon dating of plant material from the midden. AMS dating is a specific type of radiocarbon dating. It requires smaller sample sizes and gives more precise dates than other forms of carbon dating making it ideal for plant remains (Beta Analytic Radiocarbon Dating).

The chronology of the South Plaza proved to be more complicated. Over the initial weeks of excavation, sherds with clear Plaquemine designs were found in the dry screen in significant enough numbers that the area began to look like a later deposit. Once corn was found in a water screening sample from the same unit, this suspicion seemed confirmed. However, we were also recovering significant amounts of Coles Creek ceramic material. AMS radiocarbon dates on plant material from the midden and features uncovered in the South Plaza indicated that at least part of the plaza occupation took place during the Coles Creek period, as originally suspected, while some activity undoubtedly continued into Plaquemine. Further excavations in subsequent seasons will help elucidate this.

South Plaza (989R546 and 991R546)

The South Plaza was excavated in an attempt to discern what off-mound activities were taking place at Smith Creek. Feltus, a contemporary site 35 miles to the north, showed significant ritual activity in its southern plaza (Kassabaum 2014). Furthermore, Joe Collins's excavations in the Smith Creek south plaza found a line of

posts, significant midden, and evidence of charcoal pits (Boggess and Ensor 1993). Combined, this evidence suggested that the South Plaza had the potential to provide important information about the use of the Smith Creek landscape more broadly.

The 2015 units yielded a thick midden, rich in pottery and paleobotanical remains, with 31 possible features beneath. Some of these proved to be false features when excavated, and some could be seen extending higher into the profile and therefore had likely been missed at their tops in the previous level. Figure 2 shows a profile map of the units' walls, showing the stratigraphy and some features which were bisected by the excavation limits. The stratigraphy shows a plow zone, which contained modern and historic contaminant, on top of a midden zone rich in archaeological material. The A horizon, which would have been the topsoil during prehistoric occupation, is unidentifiable, however the E horizon, which would have lain between the topsoil and sterile subsoil, and the Bt Horizon, which is the sterile subsoil are clearly visible. Figure 3 shows a plan view map of the units' floor containing features. These features are a combination of 5 pits (Feautres 9, 15, 21A and B, 27, 28) and 24 possible post holes (Features 1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 13, 14, 16, 17, 18, 19, 20, 22, 23, 24, 26, 29, 30, 31), some of which yielded pottery and botanical remains. For this study, all of the flotation samples were taken from Level 3 excavations in both units, which comprises 53 to 76 cm below the datum and falls entirely within the midden layer, and from Feature 9, a small charcoal pit in the southeastern corner of the excavation.

Without further excavations it is difficult to know exactly when the features were dug and the midden was laid down. The best conclusion at the present is that the southern plaza area of the site was used, substantially, in at least two different time periods, Coles Creek and Plaquemine.

Paleobotanical Recovery

The material examined in this paper was recovered during the 2015 excavations. The vast majority of the paleobotanical remains were recovered via flotation. In a unique case, some carbonized material was found *in situ* in Feature 9, a small charcoal-filled pit. This was carefully extracted with much of the surrounding soil matrix, packaged, and brought back to the laboratory. Additionally, paleobotanical materials were recovered from both the dry and water screens when noted, though that material is not included in my formal analyses.

The methods used for in-field recovery were consistent with the standard practices for this region. Each level below the perceived plow zone was sampled for water screening and flotation. Water screening samples consisted of five five-gallon buckets, and were screened with a hose through 1/4 and 1/16th inch screens in the field. The presence of corn in the water screening sample from Level 3 in 989R546 provided the basis for this research's focus on the South Plaza.

Flotation is a method by which water is agitated, either mechanically or manually, causing the now cleaned carbonized plant remains in a sample to either sink to the bottom of a tank, comprising a part of the heavy fraction along with ceramics, stone, and other artifactual materials, or float to the top to be skimmed off into the light fraction. Since the introduction of this technique much finer and more diverse sets of botanical remains have been recovered from sites (Marston, Warinner, and Guedes 2014). Flotation samples at Smith Creek were generally 10 liters and were processed in the field with a mechanized flotation machine. In the case of certain features, the entire context was floated, resulting in samples of more or less volume. In the case of large features, left over soil was either water screened or dry screened depending on the discretion of the unit supervisor.

Both recovery methods introduce an artificial bias to the sample. The deposition itself contains a limited number of the plants that would have been utilized prehistorically, a number that would be further decreased by archaeological sampling and subsequent processing. While methods were chosen in an attempt to recover the most comprehensive sample, all data is, by its nature, partial.

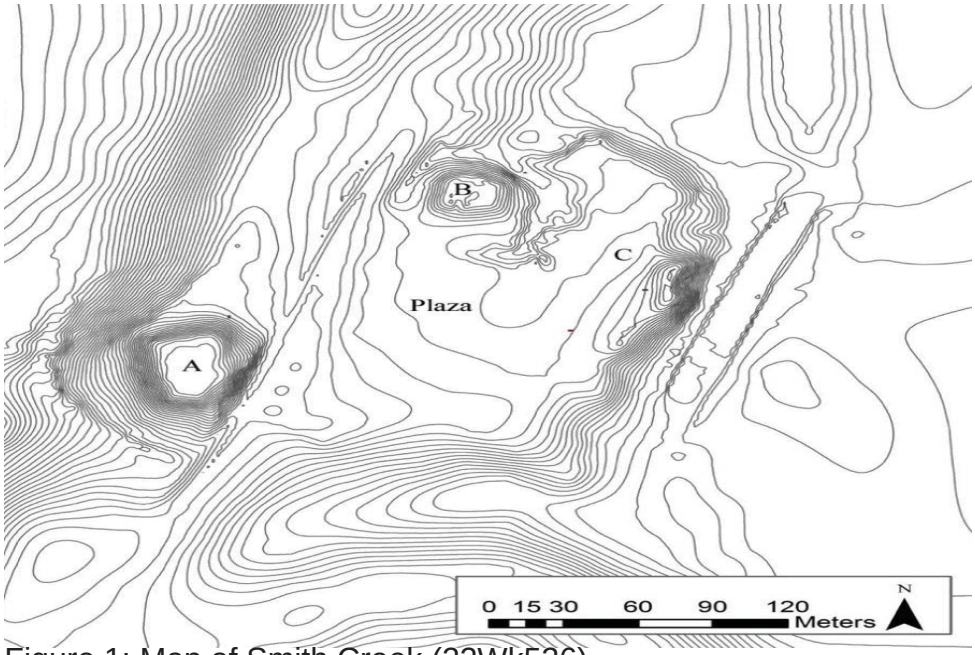

Figure 1: Map of Smith Creek (22Wk526)

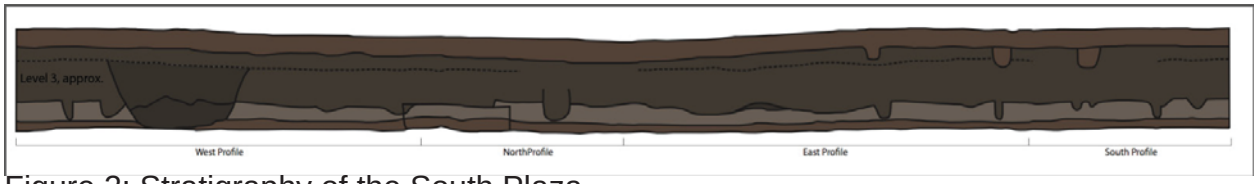

Figure 2: Stratigraphy of the South Plaza, Units 989R546 and 991R546

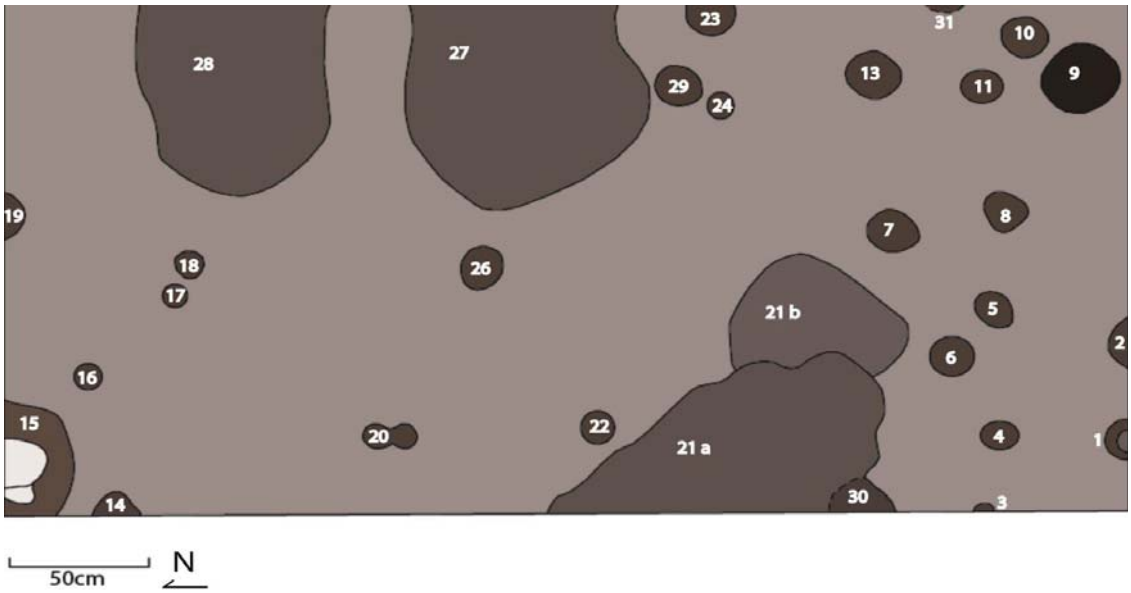

Figure 3: Floor map of the South Plaza, Units 989R546 and 991R546, with features labeled

Samples were further processed in the Center for the Analysis of Archaeological Materials at the University of Pennsylvania's Museum of Archaeology and Anthropology. All plant material recovered was carbonized, and anything that was not was dismissed as modern contamination. Only one bag of water screened material was examined (Bag 41), and only the 1/16th-inch fraction was studied due to the presence of corn noted in the field. This sample was scanned for corn and the other material was replaced for further sorting at a later time. The other samples examined were the light and heavy fractions of flotation samples. Both the remainder of this sample and the other water screening samples still contain large amounts of unsorted botanical material, which could be interesting if examined for another project.

For both the flotation and water screening, all sorting was done with either the naked eye, a low-magnification binocular head magnifier, or a low-powered light microscope. Botanical remains were identified to the species level when possible. When not possible, some were put into a category of multiple possible species, or genus or family-level designations. Samples were sorted by the author and then checked for accuracy by Megan Kassabaum. Resources used to identify plant remains include Martin and Barkley's seed identification manual (1961) and Fritz's Paleoethnobotany laboratory guide (2007). Initially the intent was to sort samples from multiple areas on the site, however the South Plaza produced unexpected information that merited the sole consideration of a thesis of this sort.

Plants Recovered at Smith Creek

Discussed in this article are the plants recovered at Smith Creek during the 2015 field season. All plants recovered are listed in Table 1 and the provenience of each sample is shown in Table 2.

The data examined in this section are from four of the Smith Creek samples from 989R546 and 991R546, both in the southern plaza. Because all of these samples essentially come from one area on the site and from the same stratigraphic context, no intrasite comparisons were made and the data are treated as one set. The purpose is less for comparing concentrations of any plant, and more to discuss the plants present at Smith Creek in general.

Data are split into the following major categories: nuts, starchy and oily seeds, fruits, and miscellaneous. The four species of nuts identified are native to the region and commonly found at Coles Creeks sites, making them an expected find. Five starchy and oily seed species, that would likely have been eaten for food, were identified. Again, all were expected local plants.

Conclusion

Smith Creek fits the expected subsistence strategy for a Coles Creek site, with some exceptions. The presence of corn on site, however, indicates a later usage by Plaquemine people, though the extent of this occupation is still unknown. The presence of sweet gum poses interesting questions about ritual plant use on site, as it has no nutritional properties and cannot be used as food. While it was likely used as a medicine, the context in which it was recovered suggests something else was occurring.

Overall the Smith Creek site was well understood from excavations in 2013 and 2015. However, it is only in conjunction with paleobotanical analysis that the complicated use and reuse of the site has come to attention, and it is likely through further paelobotanical analysis that answers to remaining questions will be obtained.

	Common Name	Usages	Taxonomic Name
Nuts	Acorn	Nut (Starchy)	*Quercus* spp.
	Hickory	Nut (Oily)	*Carya* spp.
	Pecan	Nut (Oily)	*Carya illinoensis*
	Walnut	Nut (Oily)	*Juglans nigra*
Starchy and Oily Seeds	Amaranth	Seeds (Starchy)/Greens	*Amaranthus* sp.
	Chenopod	Seeds (Starchy)/Greens	*Chenopodium* sp.
	Cheno-am	Seeds (Starchy)/Greens	*Chenopodium/Amaranthus* spp.
	Maygrass	Seeds (Starchy)/Greens	*Phalaris caroliniana*
	Smartweed/Knotweed	Seeds (Starchy)/Greens	*Polygonum* spp.
	Squash	Seeds (Oily)	*Cucurbita* sp.
Fruits	Grape	Fruit	*Vitis* sp.
Other	Bedstraw	Medicinal	*Galium* sp.
	Corn	Vegetable	*Zea mays*
	Crabgrass	Weed	*Digitaria* sp.
	Purslane	Medicinal	*Portulaca* sp.
	Sweet Gum	Medicinal/Ritual	*Liquidambar stryaciflua*

Table 1: Species identified as Smith Creek

	Catalog Nos.						
	Heavy	Light	Analysis Unit	Volume (L)	Plant Weight (g)	Wood Weight (g)	Other Weight (g)
South Plaza, Midden							
	43	42	989R546	10	1.29	0.69	67.28
	39	38	991R546	10	0.86	0.41	51.45
	67	68	989R546	9	3.20	0.47	13.33
South Plaza, Feature 9							
	108	109	989R546	16	16.30	0.96	6.23

Table 2: Provenience of samples at Smith Creek

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