

An Archaeological Analysis to Determine Seasonality at the Cade 9 Site in Vernon County, Wisconsin

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ABSTRACT

Excavations during the summer of 2007 at Cade 9 (47Ve625) in Vernon County, Wisconsin, revealed several features with diagnostic pottery from the Great Oasis culture. The Great Oasis culture is known to have extended from northwest Iowa to Nebraska, and has not been previously found in Wisconsin. A sample of the floral remains from these features was analyzed to determine the seasonality of the occupation, and wood charcoal was radiocarbon dated to an approximate time span of circa A.D 1040 +/- 30 (uncalibrated). The results suggest warm weather agriculture with no winter components.

INTRODUCTION

Great Oasis was first defined as a transitional culture between Woodland and Oneota lifestyles by Lloyd Wilford (Wilford 1945). Since then, continued archaeological excavations have determined that it extended from northwest Iowa and Minnesota to as far west as Nebraska. Great Oasis sites are identified through two distinct ceramic styles; high rim and wedge lip, and are commonly located on first and second terraces along waterways (Anderson 1998). It is known that the Great Oasis people practiced small-scale agriculture from the presence of cultivated corn, squash, sunflower, and tobacco at many Great Oasis sites – their diet was further supplemented by a wide range of fauna – including white-tailed deer, bison, and canines (Lensink and Tiffany 2005). While their seasonal round remains unclear and the subject of much debate, data from the Cowan site (13Wd88) suggest a year-round occupation. While the Cowan site is one of the best-studied Great Oasis sites, other evidence indicates a seasonal round of movement of more permanent winter settlements with smaller and more dispersed flood-plain farming hamlets during the summer (Anderson 1998, Lensink and Tiffany 2005).

The Cade 9 site (47Ve625) is located on a terrace just north of the North Fork of the Bad Axe River in Vernon County, Wisconsin in part of the unglaciated Driftless Area. Because of its location, the site was not subject to flooding over the years. It was excavated for the first time in 1995 and most recently in 2007 as part of the UW-L Archaeological Field School. Three pit features were eventually identified and the materials recovered from these will help to answer several questions regarding this site. The first research question examined is in regards to the time period that the site was occupied, which has been resolved through radiocarbon dating of charcoal recovered from the site and ceramic typology analysis. Secondly, the floral remains will be examined to try to determine the seasonality of the site and how it fits in with the known Great Oasis settlement pattern. Because no Great Oasis site has been previously found in Wisconsin, Cade 9 can provide important information on whether or not it represents a change in their settlement pattern or simply a farther expansion than was previously known.

Background

The Woodland tradition is first defined with the presence of pottery, and it began approximately 500 BC. It is divided into early, middle, and late, and the Great Oasis culture existed during the Late Woodland period. The Late Woodland period in Wisconsin, dating from approximately AD 600 to 1000, has a number of general characteristics setting it apart from the earlier periods, including the building of effigy mounds (Theler and Boszhardt 2003). Two of the most significant changes were the invention and subsequent spread of bow and arrow technology, which made hunting easier, and the beginnings of garden and cultivation, which caused a change in seasonal movements (Anderson 1998). In the Bad Axe River Valley in particular, Late Woodland groups began to settle year-round because of the continuous availability of resources (Theler and Boszhardt 2003).

Great Oasis is a transitional culture between Late Woodland and Oneota that was centered in central and western Iowa, with outlying sites in Nebraska, South Dakota and Minnesota (Alex 2002, Lensink and Tiffany 2005).

The typical Great Oasis village consisted of rectangular wattle-and-daub houses that contained hearths and garbage pits. Like most other Late Woodland societies, the Great Oasis used the bow and arrow technology to great effect, hunting deer, bison, wolf, and coyote. Great Oasis is characterized by two distinct pottery styles, high rim and wedge lip (see Figure 1). Both styles are globular jars with rounded bottoms and shoulders, and have decorations primarily on the rims. High rim has parallel sides with flat lips, and will often have distinctive designs, including triangles, diamonds, chevrons, and stylized corn, trees, and deer. Wedge lip rims are short with flat lips that are beveled in the direction of the exterior. All of the pottery is grit tempered and manufactured with paddle and anvil modeling (Lensink and Tiffany 2005). One shard with distinct Great Oasis decoration was sent for thin section analysis to determine constituent materials.

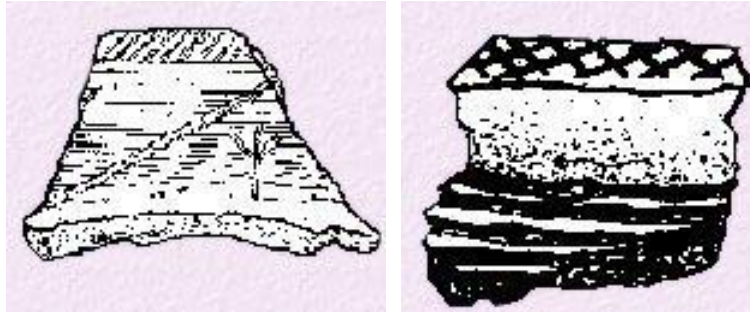


Figure 1. Great Oasis High Rim (left) and Wedge Lip (right)
Illustrations by Mary Slattery and Rick Friday (Anderson 1998)

Environmental Background

Cade 9 is located in the unglaciated Driftless Area of southwestern Wisconsin (see figure 3). During the last ice age, glaciers covered much of Wisconsin, but the southwestern part was not affected and as such the area is characterized by high limestone ridges and deep v-shaped valleys (The Wisconsin Cartographer's Guild 1998). These landscape features were formed mainly through stream erosion.



Figure 3. Location of the Bad Axe River Valley in the Driftless Area in southwestern Wisconsin (map courtesy Wisconsin Geological and Natural History Survey, 1971)

The area consists of a combination of southern hardwood forests and prairie savannah (The Wisconsin Cartographer's Guild 1998). Cade 9 itself is on a terrace just north of the North Fork of the Bad Axe River, and has not been subject to flooding over the years. The close vicinity to woodlands, along with the prairie ridge tops, provided a wide range of floral and faunal resources to be exploited, including: white-tail deer, elk, birds, small mammals, nuts, sunflower, and berries. Fish from the Bad Axe River would have been an important part of their diet as well. The Great Oasis sites in Iowa, Minnesota, South Dakota, and Nebraska are typically located on intermediate and high terraces, and the range of floral and fauna recovered from other Great Oasis sites is very similar to that available in southwestern Wisconsin.

METHODOLOGY

Field Procedures

During the excavations at Cade 9 in the summer of 2007, five pit features were initially identified on the site (see Figure 4). Of these, feature 5 was found to be a false positive, and feature 3 was only 2 cm deep and contained no artifacts.



Figure 4. Site map of 2007 excavations at Cade 9

Once uncovered, features one, two, and four were mapped in plan view, bisected across the longest part, and the soil removed in arbitrary 10 cm levels until sterile soil was reached. After half of the feature was removed, the profiles were mapped and photographed before removal (see figures 5-10).

Feature one had a maximum length of 80 cm, a maximum width of 95 cm, and a maximum depth of 38 cm. Pottery, charcoal, and flakes were found throughout the feature, and there was no discernable stratigraphy. The soil was 10yr4/2 with some mottling with 10yr5/3. Feature two had a maximum length of 85 cm, a maximum width of 90 cm, and a maximum depth of approximately 25cm. Pottery, charcoal, and flakes were also found in this feature, in addition to calcified bone. The soil was identified as 10yr3/4 that gradually changed to 10yr3/3 with greater depth. Feature four had a maximum length of 85 cm, a maximum width of 80 cm, and a maximum depth of 26 cm. Like the other two features, feature four contained pottery sherds, flakes, and charcoal throughout. It is likely, based on the remains recovered, that these three features were middens.

Charcoal and the visible pieces of pottery were removed and bagged separately to be taken back to the lab for analysis.

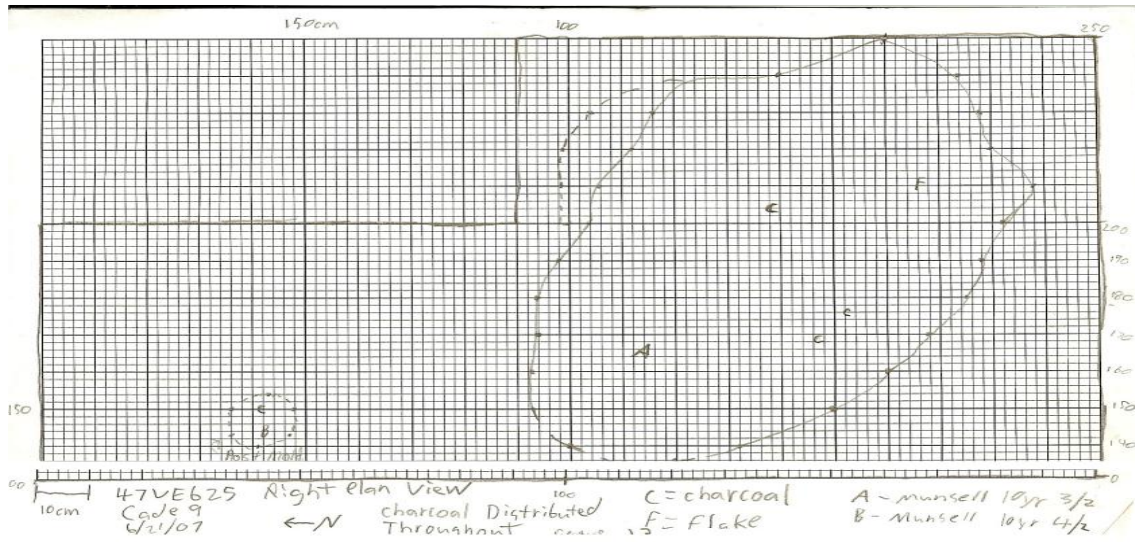


Figure 5. Map of Feature 1 in plan view

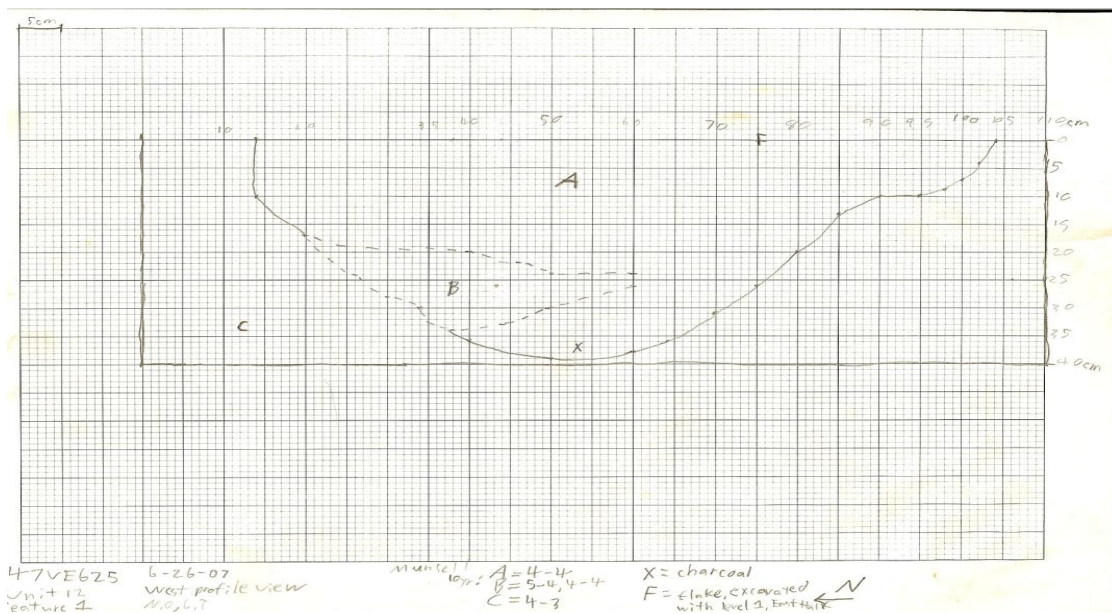


Figure 6. Profile map of Feature 1

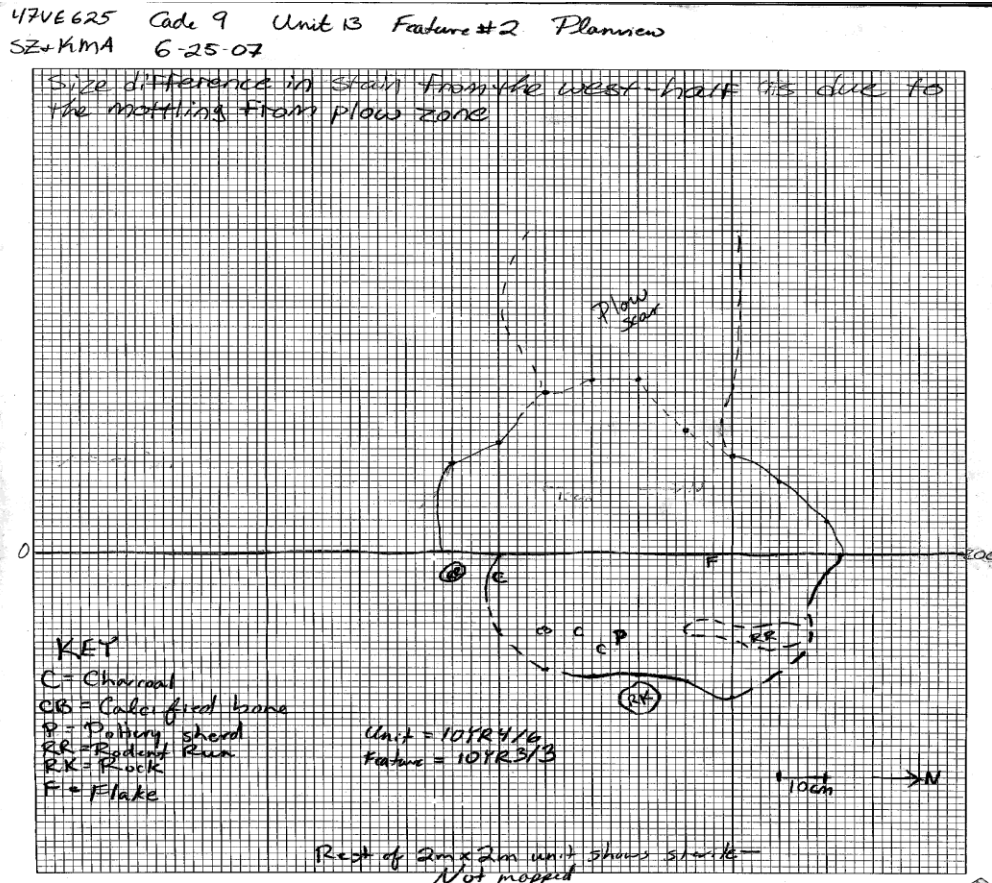


Figure 7. Map of Feature 2 in plan view

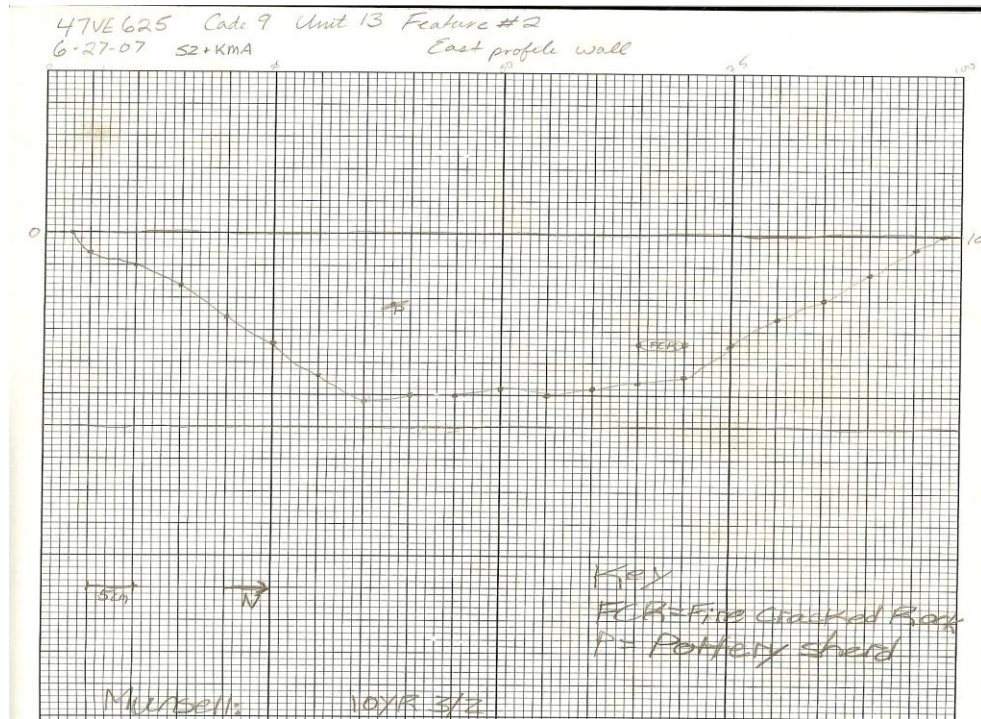


Figure 8. Profile Map of Feature 2

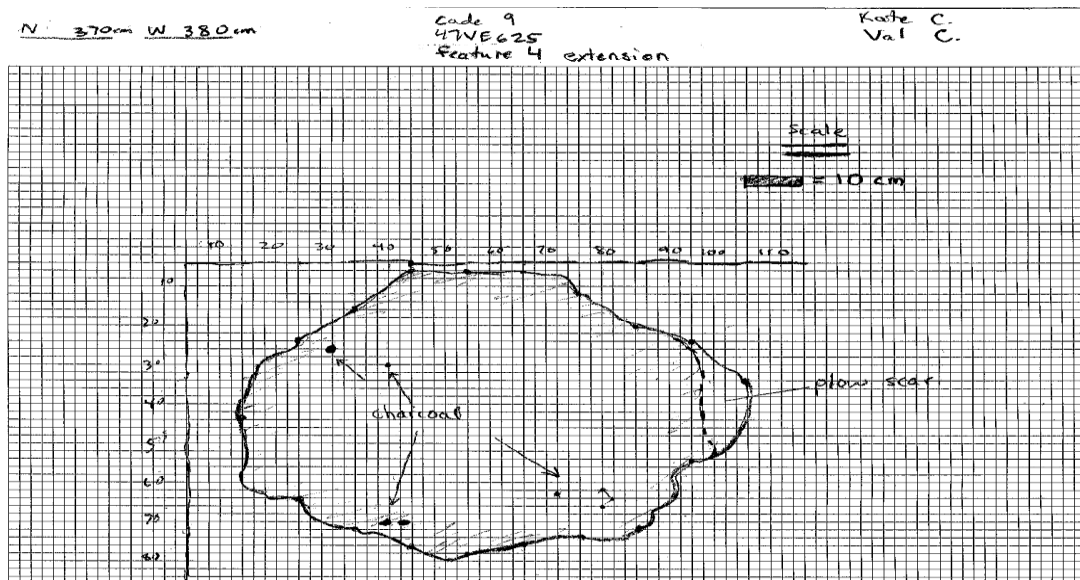


Figure 9. Map of Feature 4 in plan view

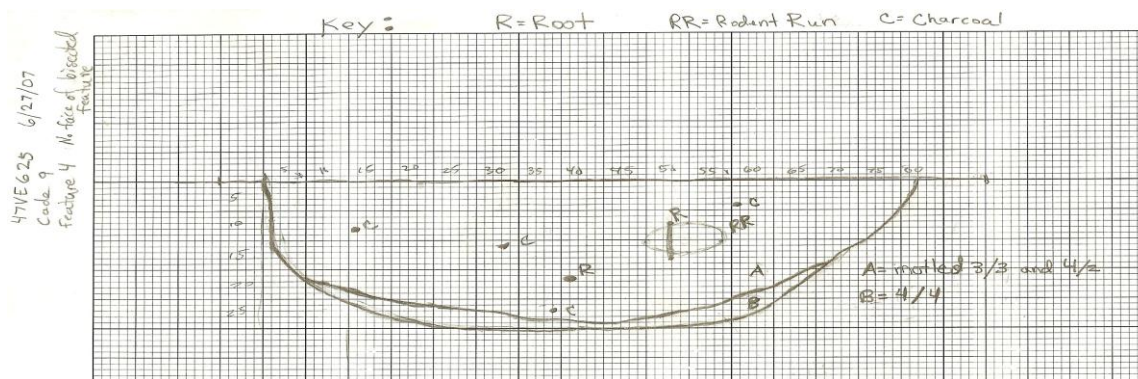


Figure 10. Profile map of Feature 4

Lab Procedures

The charcoal taken from the field for radiocarbon dating was washed, weighed, and sorted, and then a sample from each feature was dated at the University of Georgia. There, the charcoal samples were “treated with 5% HCl at the temperature 80°C for 1 hour, then it was washed and with deionized water on the fiberglass filter and rinsed with diluted NaOH to remove possible contamination by humic acids. After that the sample was treated with diluted HCL again, washed with deionized water and dried at 60°C. For conventional analysis the cleaned charcoal was combusted in Parr bomb under oxygen pressure. The recovered carbon dioxide has been cryogenically purified and converted to benzene on V-Al-Si catalyst. The sample $^{13}\text{C}/^{12}\text{C}$ ratios were measured separately using a stable isotope ratio mass spectrometer and expressed as $\delta^{13}\text{C}$ with respect to PDB, with an error of less than 0.1‰. The activity of the sample has been measured on the liquid scintillation analyzer Packard Tri-carb 1050 and reported as radiocarbon age” (Cherkinsky 2008).

Once the soil samples were completely dried they were floated to recover floral and other remains from the site. Floatation begins with dried soil. Samples are then placed into a bucket and then completely saturated by water, which allows the charcoal and other buoyant remains (also known as the light fraction) to float to the top. That water is carefully decanted through a No. 40 mesh (.425 mm) screen that ensures the charcoal will be retained but that the fine silts will wash through. Once there is no more charcoal floating at the top and the water runs clear, the light fraction is rinsed into clean muslin and closed up to dry. The remainder of materials, called the heavy fraction, is now rinsed into the No. 40 mesh screen as well and bagged up in muslin to dry. In total, 454 liters of soil were floated.

The dried light fractions were examined under a microscope to extract identifiable plant remains. Because of the presence of diagnostic pottery, Feature 2 was chosen for complete analysis by level of its floral remains. For smaller samples from a particular level, the entire light fraction will be analyzed. However, for larger samples, a sampling process is used. The dried light fraction was sieved through nested 10 (2.000 mm), 20 (.850 mm), and 40 (.425 mm) mesh screens, and a sample is taken from each level. A 100% sample has been sorted from the 10 mesh, because it is at this size that important remains, like corn, will be found. From the 10-20 mesh, a 25% sample has been sorted for all proveniences (excepted Level 1 E $\frac{1}{2}$ (5-10 cm, where a 50% sample was taken), and from the 20-40, a 1/8 sample (excepted Level 1 E $\frac{1}{2}$ (5-10 cm, where a 25% sample was taken).

One of the primary ways to determine species and maturity of the plant remains is to use a comparative collection, so once a species has been identified, it is possible to determine when that plant produces flowers and/or seeds and therefore what time of year it would have been available to the occupants of the site. MVAC has an extensive collection of charred floral remains common to sites in the Upper Mississippi River Valley, and this in addition to personal communications with Connie Arzigian allowed for the determination of species of remains.

RESULTS AND CONCLUSIONS

Temporal Results

The three dated charcoal samples from the features were found by the University of Georgia’s Isotopic Lab to have an uncalibrated date of A.D 1040 +/- 30 for Feature 4 and A.D. 1060 +/- 30 for Features 1 and 2. However, as the charcoal samples were comprised mostly of wood some error is expected due to natural age variations.

| UGAMS# | Sample I.D. | Radiocarbon ^{13}C Corrected Age (YBP \pm 1s) | $\delta^{13}\text{C}$ (%) |
|--------|-------------|---|---------------------------|
| 02517 | 2007.0581 | 890 \pm 30 | -26.1 |
| 02518 | 2007.0582 | 890 \pm 30 | -25.3 |
| 02519 | 2007.0583 | 910 \pm 30 | -25.3 |

(Cherkinsky 2008)

These initial dates were calibrated using an online program called CALIB. All three samples had peaks from A.D. 1055 to A.D. 1075 and at approximately A.D. 1157, so it is very likely that they were open at the same time (see figure 11). These two peaks in time are intriguing because the Great Oasis culture spanned from approximately A.D. 950 to 1100, making the A.D. 1055 to 1075 range more likely for a Great Oasis occupation. However, an A.D. 1157 peak date would place Cade 9 significantly later than the known Great Oasis time period. Further research, including more radiocarbon dates from Cade 9 as well as known Great Oasis sites, will help clarify this issue.

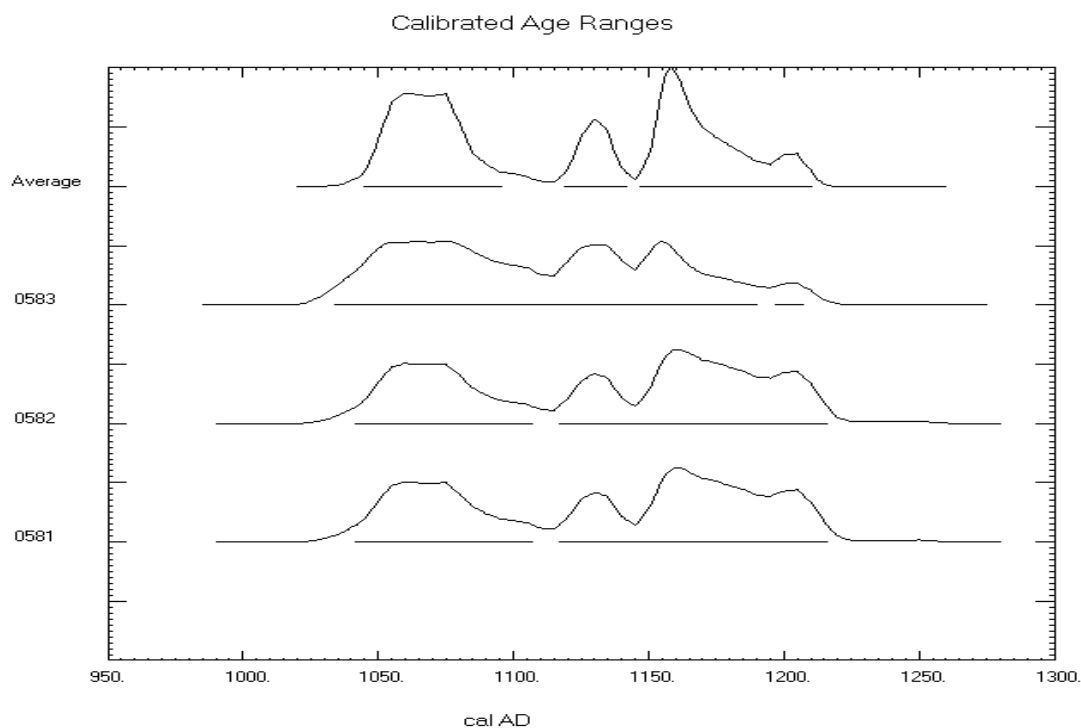


Figure 11. Probability distribution of calibrated radiocarbon dates, including average dates

Seasonal Results

The floral results from feature 2 yielded corn kernels, cupules, and embryos, grass seeds, hickory nutshell, squash rind, and goosefoot. Two small bud fragments were also found. Throughout the feature corn comprised 44% by weight of total floral remains, with individual provenience variations ranging from 23% to 83% corn. The presence of corn cupules is especially important because they represent the waste product and would not be present if the corn were being imported or stored for later consumption. The presence of corn embryos is also intriguing because they rarely survive through processing, much less in the archaeological record.

Densities of floral remains in Feature 2

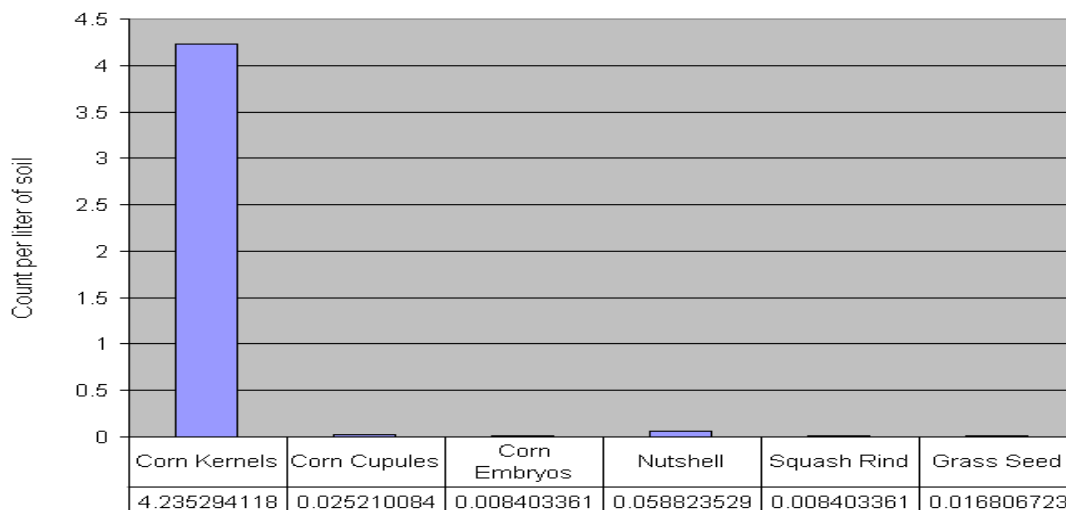


Figure 12. Graph showing count per liter of soil (of 119 liters total) of floral remains from Feature 2

While the samples from Cade 9 yielded no evidence of summer fruit seeds or specific species of weeds other than chenopodium, the presence of corn, squash, nutshell, and grass seeds suggest a summer occupation. This, in combination with the lack of evidence for storage pits, supports the conclusion that Cade 9 functioned as a one-time summer agricultural hamlet for a group of Great Oasis people.

Discussion

It is clear that the people occupying Cade 9 were practicing a low scale but diverse agriculture system comprised primarily of the production of corn with supplemental foodstuffs gathered from the surrounding area. These agricultural activities would have begun in early spring (as evidenced by the recovery of charred buds) and continue into late fall for final corn processing. A fragment of calcine bone preliminarily identified as an unfused epiphyses (likely from a radius) of a young white-tailed deer also supports this time frame, as the bone would have fused by around November (Theler 2008). Finally, there were no storage pits uncovered, which would have indicated cold weather occupation.

During the terminal Late Woodland period, effigy mound peoples in the Bad Axe River Valley had increased in population and had begun to occupy the area year round (Theler and Boszhardt 2006). This increased pressure caused a significant drop in natural fauna, particularly white-tailed deer, and as a result corn was increasingly cultivated to provide adequate subsistence. However, corn production at this time was labor intensive with low yield, and was not sufficient to make up for the deficiency caused by the over-harvest of local fauna. These factors have led to the discussion that the interior of the Driftless Area, including the Bad Axe River Valley, had become largely inhabitable and was mostly abandoned at the end of the Late Woodland period (see Theler and Boszhardt 2006).

Two pottery samples from Cade 9, one distinctly Great Oasis in style and another Madison Cord-Imprinted, were sent off for thin section analysis by Dr. Jim Stoltman. The temper of both sherds was a local quartzite. In addition to the stylistic differences, there was variation in the amount of temper used, and the paste production. These results indicate a number of different possibilities. While there was clearly interaction between two groups, whether through long-distance trade or through close settlements as evidenced by the two distinct pottery styles, this suggests that a local Late Woodland population was still occupying the Bad Axe River Valley at the time. Rather than an entire group of Great Oasis, it is possible that just one person, likely a female, ended up with an Effigy Mound group in the Bad Axe River Valley. It is clear that more research, including continued excavation at Cade 9 as well as continued discovery of Great Oasis sites, is necessary to completely answer the research questions put forth.

ACKNOWLEDGEMENTS

I would like to recognize and give my gratitude to: Connie Arzigian, who advised and assisted me throughout the lab work and analysis required and provided me with a sounding board for different ideas; Jim Theler, for leading the field excavation and advising me in many different aspects along the way; Loren Cade, for allowing the 2007 summer field school to work on his property; Dr. Jim Stoltman, for completing the thin section analysis; the Mississippi Valley Archaeological Center for use of the laboratory, to the University of Georgia's Isotopic lab for providing radiocarbon dates; to the University of Wisconsin-La Crosse for providing me with an undergraduate research grant; and finally, to all of my ARC 499 peers and Lauren Jagielski in particular for advisement and encouragement from the very beginning of my research.

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