Characterizing the Archaic Period along the Flint and Chattahoochee River Valleys

RESEARCH

Located within the Chickasawhatchee Creek watershed and downstream neighborhood of the Lower Flint River, the Chickasawhatchee Archaeological Survey (CAS) targeted a variety of ecological areas with the purpose of better understanding land use in upland environments throughout preliminary (Waggoner 2009). James Waggoner Jr. identified archaeological site types based on the distribution of lithic artifacts found during the Late Archaic period (3000-1000 BCE) (Figure 1). The North and South survey areas contained different types of archaeological sites, but it could not be determined if these differences reflected a substrate pattern or two distinct cultural groups. To test Waggoner’s concern regarding land use patterns and cultural groups, I focus on his diagnostic hafted biface assemblage. I will utilize exploratory statistics associated with ecological communities to identify and the concept of technological components to characterize the variation (Stark 1998). I hypothesize that certain attributes of hafted bifaces are less subject to technical choice than others and thus may be more closely associated with subsistence or land use practices.

RESEARCH OBJECTIVES

- Test the use of ecological community exploratory multivariate statistics in archaeological contexts.
- Describe the patterned variation among the Late Archaic hafted bifaces recovered during the CAS.
- Explore the relationship between subsistence patterns and social boundaries within the CAS areas.
- Test the hypothesis that certain attributes of hafted bifaces are more likely to depict patterns of variation associated with technical choice.
- Conduct a preliminary analysis of Gulf-draining river basins (Figure 4).

METHODOLOGY

The benefit of interpreting archaeological data within an ecological framework is that emphasis is placed on the interdependence of species or characteristics with each other. Analyses are highly contextualized and often exploratory, making the methodology versatile even for those datasets from which patterns are sought. My methodology is based on the analysis of ecological communities for these reasons, and I use the computer program PC-ORD to generate all subsequent statistics (McCune, Grace, and Urban 2002; Peck 2010).

I utilize two forms of multivariate analysis to characterize the relationships among “species” or artifact attributes and sample units/handled bifaces: Indicator Species Analysis (ISA) and Nonmetric Multidimensional Scaling (NMS). I use the Sorensen (Bray-Curtis) distance measure because the resulting gradient of covariation between sample units and attributes is proportional to the number of attributes.

ISA is used to define the differences between pre-existing groups of sample units by describing how well artifact attributes separate into groups. Utilizing the Dufrêne and Legendre’s (1997) method for binary data, the concentration or abundance and frequency of attributes is used to describe the indicator value of different groups of sample units (McGuire, Gracco, and Urban 2002). NMS is used to summarize the relationship between these targeted attributes and sample units. There is a lack of assumptions of linear relationships because NMS utilizes ranked distances to order “sample units such that their interpoint distances reflect the redundant pattern of covariation observed in... original response data” (Peck 2010:84).

A joint plot is generated to depict the relationship between attributes and ordination space using vectors, where the angle and length is indicative of the strength of the relationship (Figures 6 and 7). Heat treatment has a strong relationship (positive 60% of the structure with a coefficient of determination of 0.82).

Those attributes associated with the blade and haft elements are more likely reflective of subsistence or land use patterns as it is directly correlated with activity.

CONCLUSION & FUTURE WORK

- ISA results suggest that the abundance of certain attributes indicates the North and South survey areas.
- NMS results suggest that the North and South survey areas are not wholly responsible for the differences between attributes.
- Application of exploratory statistics was useful because of its ability to handle complex, multivariate datasets.

The results of this research are preliminary and additional application of statistics is needed before concrete conclusions may be drawn. It is intriguing that relative completeness and heat treatment of the raw material seem to correlate with the North and South survey areas. Waggoner hypothesized that differences in water between the two survey areas may be correlated with distinctions in site types. Consideration of hydrologic and topographic features may prove more useful in exploring the patterned variation identified in this dataset, specifically that associated with blade and haft element attributes.

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RESULTS

INDICATOR SPECIES ANALYSIS

ISA analysis identified descriptive variables associated with North and South survey areas (Chart 1). Indicator Values and significance scores were both assessed, and final decisions pertaining to descriptive attributes were made based on the relationship between these statistics.

For the haft element, a straight haft shape along with straight and eccentric spine sides are considered descriptive attributes. For the blade, rounded, horizontal, and inversely tapered are forms are considered descriptive attributes. A relative completeness of 100%, 75%, and 50% as well as the presence/absence of heat treatment are considered descriptive variables.

Based on the abundance of certain attributes, NMS results indicate that there is likely a correlation between the North and South survey areas and ecological communities such as grasslands and woodland.

To summarize, the abundance of the attribute Horizontal Heat Treatment (Raw) depicted as size of sample unit and ordination space. Some units are spread over a large area, indicating some samples are more diverse in the attributes they possess. Then, the Kendall’s tau-b correlation coefficient is provided with the overlay scatterplots which indicate the strength of the relationship (Figures 8-10). The Kendall’s tau-b correlation coefficient is provided with the overlay scatterplots which indicate the strength of the relationship (Figures 8-10). The Kendall’s tau-b correlation coefficient is provided with the overlay scatterplots which indicate the strength of the relationship (Figures 8-10). The Kendall’s tau-b correlation coefficient is provided with the overlay scatterplots which indicate the strength of the relationship (Figures 8-10). The Kendall’s tau-b correlation coefficient is provided with the overlay scatterplots which indicate the strength of the relationship (Figures 8-10). The Kendall’s tau-b correlation coefficient is provided with the overlay scatterplots which indicate the strength of the relationship (Figures 8-10). The Kendall’s tau-b correlation coefficient is provided with the overlay scatterplots which indicate the strength of the relationship (Figures 8-10). The Kendall’s tau-b correlation coefficient is provided with the overlay scatterplots which indicate the strength of the relationship (Figures 8-10).