Refining Point Types in Southwest Mississippi

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Abstract

Projectile points are largely overlooked in studies of the Lower Mississippi Valley despite the potential value they may add to an archaeological assemblage. I am studying a collection of points from and around Feltus, a Coles Creek period site in Natchez, MS, in an attempt to tighten our understanding of typologies in this area through classification and statistical analysis. The collection contains points dating from Paleo-Indian through the Coles Creek period, indicating long temporal use of the region. This study aims to improve our knowledge of lithics in the Lower Mississippi Valley and to also explore the possible uses this information may have in future studies.

The archaeology of Mississippi is well-documented in regards to its mounds, culture, and ceramic assemblages; however, the lithic material from this area has been drastically understudied. In an attempt to put lithic knowledge on par with that of ceramics in Mississippi, I have begun a long-term project to study the projectile points from the Feltus Mounds, a Coles Creek period site in Jefferson County, MS, and its surrounding areas. The primary goal of this study is to classify the points in order to discern if they fit into the temporal and regional setting of Feltus or if there is any evidence of earlier occupations and peoples. As a secondary objective, I will look at the typologies of the points, especially the Collins and Alba points to determine if these types and varieties are statistically useful. By the end of this study, I hope we will have a better understanding of the Mississippi projectile point assemblage.

(Slide 2)The sample of points used for this study comes from three different sources. The UNC-Chapel Hill's Research Laboratories of Archaeology has 77 broken and whole points from the Feltus Mounds site, which are provenienced by unit number. (Slide 3)To increase my sample size, I received generous loans from two collectors, Robert Prospere and Joseph "Smokye" Frank.

(Slide 4)Frank's collection contains 16 points from unspecified surface contexts of the Feltus Mounds area. (Slide 5)Robert Prospere's collection includes 752 points that were surface-collected from the Feltus site and nine surrounding fields. Prospere remembered the location of each point for a few decades before he drew a diagram that indicated the general provenience of each point. In March 2011, I met with Prospere to collect the points, which we organized based on their contexts. Prospere's memory and the diagram he had drawn did not always agree, and, to further complicate matters, some of the points from Field 1 were not collected by Prospere but by a little boy who lived nearby and sold them to Prospere for a quarter. Thus, the accuracy of each point's context cannot necessarily be guaranteed, but I must assume they are correct for the purposes of this study.

(Slide 6)Here is the map Prospere drew of the 10 fields he collected. I have taken this map and situated the fields onto satellite imagery using aerial photos from the 1970s, and Google Earth historical imagery dating from 1989 to 2009. (Slide 7)This map is from the most recent Google Earth imagery. (Slide 8)The Feltus site is situated on the edge of the Natchez Bluff, which is approximated by the green line on this map. In the center is Field 1, also called Feltus 1, which is the Feltus site itself, surrounded by Mounds A, B, and C. This is where all of the RLA's and Frank's points come from. The majority of Prospere's points, 425 in all, were found in this field. To the east is Field 2, which contains the second largest assemblage, consisting of 102 points. To the west are the Pumpkin Lake fields. Pumpkin Lake 8 is the field associated with the Pumpkin Lake Mound, which has been only minimally studied. The shapes and conditions of these fields have changed throughout the decades, yet all but Pumpkin Lake 9 and 10 are still fields.

(Slide 9)As you can see from this distributional map, some fields, like F1, F2, and PL8 have an abundance of points, whereas other fields' collections are sparse. Whether these distributions reflect the actual quantity of points in each field or are merely a result of sampling bias is unclear. I cannot say much about those fields with few points, but, for Fields 1, 2, 3, and Pumpkin Lake 8, the analyses of their collections suggest information about what peoples passed through these areas.

(Slide 10)The points represented in these collections span the Paleoindian through Woodland periods. From the Paleoindian period, there is one Arkabutla, one Plainview, and a few San Patrices or Dalton points. However, the dominant point types date to the Archaic and Woodland Periods.

(Slide 11)For the Archaic points, there are 73 St. Tammany points. These points, which date to the Early Archaic are distinguished by long parallel sides that are strongly serrated. Their most diagnostic characteristic is the so-called screw-driver tip, where the parallel sides suddenly stop and abruptly come to a point (Brookes *et al.*, 2011; McGahey 2000). Among these points, I have found six different varieties of stems, including wide square, narrow square, expanding, bifurcate, and rounded, with the majority having a wide, square stem. Currently, I do not know if these stems reflect anything more significant than different styles of manufacture. (Slide 12)Looking at the distribution map, most of these St. Tammanys are heavily concentrated in Field 2. At the moment, little is known about this field, but these points may suggest that there was an Early Archaic component in this locale.

(Slide 13)Of particular interest to me are the Late Archaic points. One such type is the intricate and thick Pontchartrain, (Slide 14) as well as Smithsonia, which is finely retouched like Pontchartrain, but is thinner and has a more triangular-shaped body. (Slide 15)However, there

are also 74 potential Late Archaic points of indeterminate variety. Most of these points could be easily classified as Kent or Edwards Stemmed, though, in the literature, the two definitions are nearly indistinguishable except that they are chronologically set apart by about one thousand years. Both types consist of relatively straight stems and bases with roughly asymmetrical blades. It is common for cortex to be left on the bases, possibly demonstrating expediency or a distinctive technique in manufacture. Given their association with the Pontchartrain and Smithsonia types, it can be assumed that these points fall into the Kent varieties, since they all date to about 3,500-2,500 BP. Edwards Stemmed points date to the Woodland period (McGahey 2000; Suhm and Krieger 1954; Webb 1981; Williams and Brain 1983). However, given the chronological span of this collection, I am not entirely comfortable with this assumption. Oddly enough, the majority of points I classified as Kents are in Fields 1, 2, and 3, and most Edwards Stemmed are in Pumpkin Lake 8, but these numbers are not large enough to be of any significance.

(Slide 16)The reason I do not have adequate quantities of Kent and Edwards Stemmed points is not because there are not enough points that meet these classifications, but, instead, 74 points could easily fit into either of these categories. Rather than arbitrarily classify the points, I clustered them into tentative groups based solely on morphological characteristics. In doing so, I created several groupings of points, including Group A, Group B, Group C Varieties 1, 2, and 3, (Slide 17) and Group D Varieties 1 and 2, which may or may not be useful. My hope is that these categories may illustrate some degree of chronological or spatial clustering. (Slide 18)Typologies aside, it is interesting to me that these points are clustered in Pumpkin Lake 8, which raises questions about the age and use of Pumpkin Lake Mound. Analysis of these point types and the Pumpkin Lake site will require future studies.

(Slide 19)Aside from the Group C and D points, there are several other Paleoindian or Archaic points that remain unclassified. Further research will be needed to try to classify these points. If anyone has any insights, I would love to discuss them.

(Slide 20)It is the Late Woodland points in Field 1 that are the focus of this paper, most especially those in the Collins, Alba, and Scallorn types. Collins points make up 34% of this assemblage, and, of the 296 Collins type points, all but ten were found in Field 1. (Slide 21)Collins type points are small, side-notched arrowheads with long, triangular blades (McGahey 2000; Williams & Brain 1983). Williams and Brain(1983), in their Lake George Site report, divided this type into three varieties: Collins, Claiborne, and Clifton. For the purposes of this collection, Collins v. Collins have long triangular blades that quite often come to very long, narrow, "needle-like" tips, making these points one of the few distinguishable by the tip alone (Brookes, personal communication; Williams and Brain 1983). (Slide 22)The Claiborne variety is generally wider and cruder than Collins. Instead of Collins' needle-like tip and slender, triangular body, Claiborne is wider and more parallel-sided until its mid-section, at which point the sides slowly form the tip. For this reason, Collins could be viewed as a retouched version of Claiborne. (Slide 23)The third variety, Clifton, is much smaller and is often made out of exotic material. Again, some of these points may simply be retouched versions of Collins.

(Slide 24)The vast majority of the Collins points in this collection, however, do not cleanly fall into any of these varieties. In general form, these points resemble the variety Collins except for strong serrations that extend up both sides of the blade. Neither McGahey(2000) nor Williams and Brian(1983) mention serrations in their type descriptions. While these likely belong in Collins v. Collins, I separated them into the temporary Collins v. serrated classification to discern if there is a significant difference between these two varieties.

(Slide 25)Even with these more stringent variety descriptions, there are some points that do not cleanly fit into any of these varieties. There are some Claibornes with needle-like tips, and some serrated Collins that are more ovate than triangular in shape. Also, some Collins v. Clifton points have wide bases relative to their blades, suggesting that they are retouched Collins and not a separate variety.

(Slide 26)Another side-notched Late Woodland point is Bayougoula Fishtailed (McGahey 2000; Webb 1981). Its most diagnostic feature is how the stem angles in drastically from the high shoulders then flips out like a fish's tail (Brookes, personal communication). There are three Bayougoulas in this collection, all of which were found in Field 1.

(Slide 27)There are also several varieties of corner-notched Late Woodland points used in this study, such as Alba, Scallorn, and Catahoula types. These types are easily confused as various authors give them ambiguous and overlapping definitions. Alba is a good example. Bell(1958) defines Albas as having stems varying "from parallel-edges to bulbous and fan shaped"(p.8); however, Webb(1981) has Alba's characteristic feature being its rectangular base and puts corner-notched points with bulbous stems in a different category. After studying the descriptions and point collection, I have decided to define Albas based on their rectangular stem, which may or may not diminish their degree of corner-notching.

(Slide 28)Scallorn points are very closely related to Albas; in fact, Williams and Brain(1983) made Scallorn a variety of the Alba type. I am choosing not to do this. For the purposes of this study, Scallorn points are corner-notched, barbed points with expanding stems. They are often elaborately well-made (McGahey 2000; Webb 1983), and some have small notches in the bases, as can be seen in this picture.

(Slide 29)Also studied in this analysis are Catahoula points. These are corner-notched, but their barbs are so large that they extend the length of the base (Webb 1981).

(Slide 30)Of course, as with the Paleoindian and Archaic types, I also have some unclassified points that need further study.

While some of these types, like the Bayougoulas and Catahoulas, are easy to recognize, most of these type descriptions are not clear-cut, and the tenuous lines between them can often be explained by simple retouch. For this reason, I conducted statistical analyses on Alba, Scallorn, Bayougoula and Collins varieties Collins, Claiborne, and Clifton points to determine if these types are statistically distinguishable. Catahoulas were not included in the analysis because I have no complete points in my collection.

(Slide 31)I first took measurements on these points, including total length, blade length, and stem and barb lengths, as well as shoulder and base widths. The tip width was measured one millimeter below the tip itself. The mid-section was measured halfway up the blade length.

(Slide 32)Along with the raw measurements, I also calculated four ratios of these measurements: mid-section to shoulder width, shoulder to neck width, neck to base width, and stem to blade length. A high mid-section to shoulder width ratio would imply that the point is more oval shaped; whereas, a low score would indicate a more triangular-shaped point. Similarly, a large neck to base width ratio implies that the point has a straight stem while a low ratio indicates a strongly-notched stem.

Using STATA Statistical Software, I conducted Principal Components Analysis on the standardized measurements, ratios, and the combined measurements and ratios. The goal of principal components analysis is to reduce redundancy in the variables so that the first few principal components, which in essence replace the initial variables, account for a large

percentage of the variation in the data (Davis 1973; Shennan 1988). This more easily allows you to identify meaningful variation and clustering in the data.

(Slide 33) Looking at the analysis of the standardized measurements alone, the first three components explain about 67% of the variation in the data. The amount each variable affects a component is given by the variable's loading score. We can see by the loading scores for Component 1 that this component is largely influenced by blade length and total length because these variables have the highest absolute value loading scores. Thus, Component 1 seems to measure the overall size of the projectile point. Component 2 is largely influenced by total length, barb length, tip width, and shoulder width. This combination of variables indicates that Component 2 is a measure of how long versus how wide a point is. Finally, Component 3 is dominated by the variable base width.

(Slide 34)These components can be better understood by looking at how they affect the variables, as demonstrated in biplots of the components. The first biplot of Component 2 against Component 1 shows that all variables that measure size (Slide 35) increase along Component 1's axis except for barb length, which is not a direct measure of a point's size. (Slide 36)Component 2, conversely, increases as measurements of width increase, (Slide 37)but it decreases as length increases. (Slide 38)Using these same ideas, we can look at the biplot of Component 3 against Component 1. (Slide 39) Here, Component 3 separates all variables based on which part of the point they are measuring. All measurements relating to the blade of the point are increasing along Component 3; (Slide 40) whereas, variables that measure parts of the stem decrease, suggesting that Component 3 is a measure of whether the proximal or distal end of the point is dominant. If the proximal end is dominant, then the stem and base of the point are larger relative to the blade. These same ideas can be seen in the biplot of Component 3 against Component 2.

(Slide 41) Now that we know what the components measure, we can look to the observations themselves, color-coded by type. In this graph of Component 2 against Component 1, we can see that Collins v. Collins, Collins v. Clifton, and Alba points are all clearly distinct from each other. Collins v. Collins, which are in blue, rate low in Component 2. This makes sense because Collins v. Collins is generally a long and skinny point. Conversely, Albas rate highly on Component 2 because they typically are a rather wide point. The Collins v. Clifton points are clustered together on all three scatterplots, indicating that they are very closely related in terms of size and shape, scoring low in these principal components.

(Slide 42) In a scatter of Component 3 against Component 2, Collins v. Cliftons are still clustered together, indicating that they are narrow and that their bases are their more dominant features. Bayougoula Fishtailed points, which are in green, are clearly separate from all other points in that their blades are large relative to their bases as measured by Component 3. The Albas are wide points, so they score highly on Component 2 and intermediately on Component 3 (Slide 43) As you can see, there is an outlier that is in the Scallorn range. This point was probably misclassified and should be recategorized as Scallorn. (Slide 44) The Scallorn points rate intermediately on Component 2 because they are neither very long nor wide. In many cases, Scallorns are dominated by their proximal ends, which is why they have low scores on Component 3. (Slide 45) These points are well clustered except for two outliers. The point shown is well within the Collins range, which is not pictured on this scatterplot. This leads me to believe that this point would be better identified as a Collins rather than a Scallorn.

(Slide 46)The Claibornes are the only variety that is not clearly distinct on any of the scatterplots. In general, they score higher in Component 2 than Collins because they are wider than most Collins points, but the line between these two varieties is blurred.

(Slide 47)The scatter of Component 3 against Component 1 illustrates even less clarity between the Collins and Claiborne varieties. (Slide 48) Clearly, there are some Claiborne points that fall well within the Clifton and Collins ranges. These points transcend the boundaries among these types as the one on the left appears to be a larger version of a Clifton, and the one on the right has an ovate blade shape with a Collins-like needle tip. I suspect that these different varieties of Collins points are all part of a general continuum of point manufacture in which the Claiborne was likely the first step. Visually, we can distinguish between these varieties, but the statistical analysis does not seem to reflect the differences between Collins and Claiborne. Further research will be needed to determine new measurements and ratios that may be able to show statistical differences among these varieties.

By looking at these scatterplots it seems that most of the types studied do represent natural clusters of points based on overall shape and size. The results suggest that Albas are, by definition, wider relative to their length compared to Scallorn and Collins varieties. Furthermore, the Collins varieties do reflect variations in the Collins type, demonstrating that wider points fall into the Claiborne range, longer and skinnier points are in the Collins range, and smaller points are in the Clifton range. While these data illustrate some of the statistical differences between the different types and varieties, they do not necessarily imply meaningful differences among these categories. Even though we know a Collins v. Claiborne is different from a Collins v. Collins, we still do not know if a Collins is simply a resharpened Claiborne.

Through this study, it is clear that the point typology system in Southwest Mississippi needs refinement. My work here has served to define some of these types more clearly based on statistical differences in shape and size. Future studies are needed to add further clarity to other Late Woodland points and especially to refine point types in the Archaic period.

(Slide 49)

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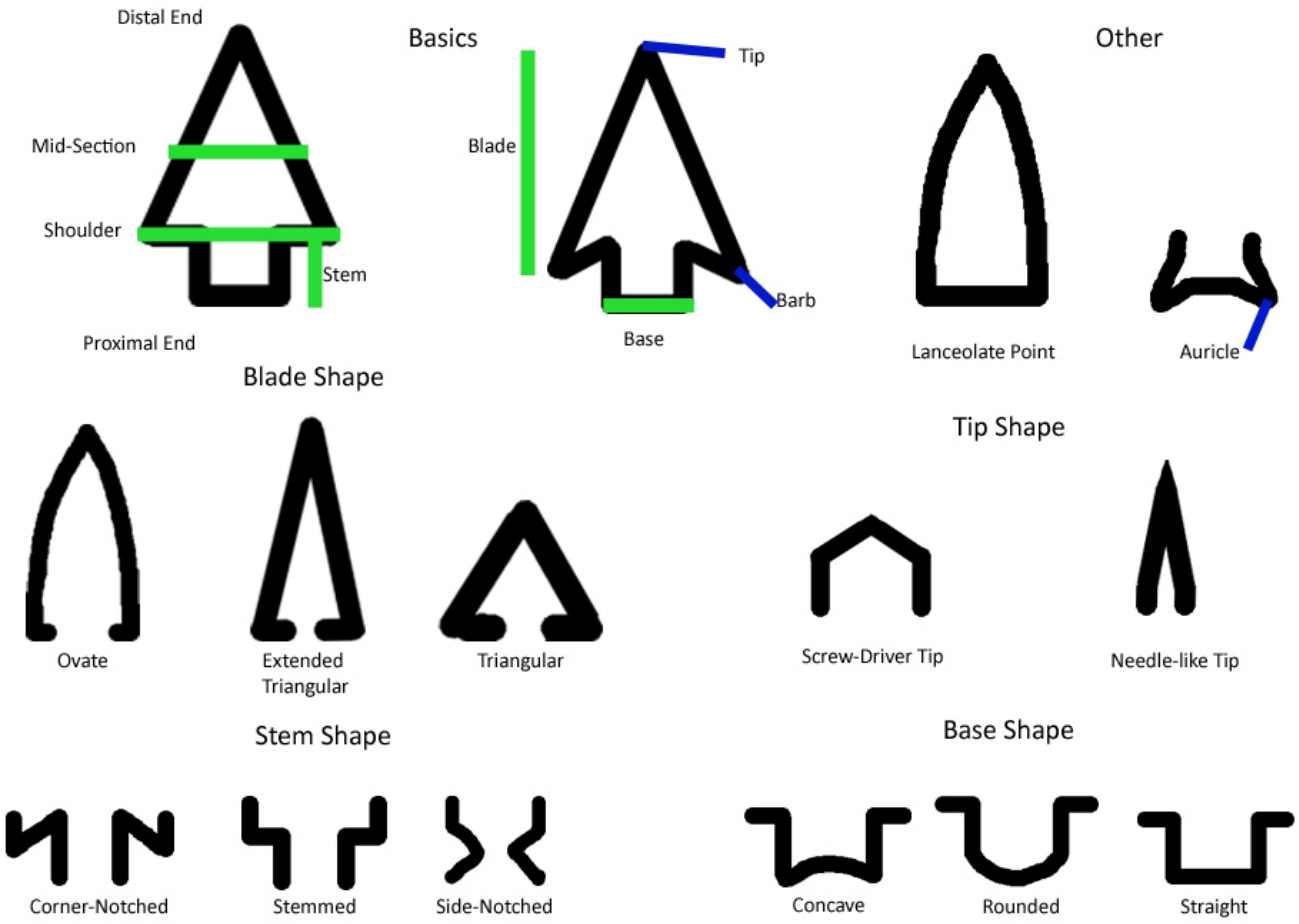
Appendix



Alba

Date: Late Woodland

Description: A small triangular-shaped point that is corner-notched to stemmed. The stem is rectangular and base straight.

Sources: Bell 1958:8; Webb 1981:14; Williams and Brain 1983:221-222

Arkabutla

Date: Paleoindian

Description: A medium-sized lanceolate point with long lateral flakes across both sides. The widest point is about half-way up the blade, and serves as an inflection point so that the blade is convex from the mid-section to the tip and concave from the mid-section to the base. The base is shallowly concave, thinned, and has small auricles.

Sources: McGahey 2000:25-26

Bayougoula Fishtailed

Date: Late Woodland

Description: A small point with an extended triangular blade. The shoulders start about halfway up the length of the point. The stem is long and strongly contracts until it abruptly expands at the proximal end of the point. The base is concave, resembling a fish's tail with pronounced auricles.

Sources: Brookes, personal communication; McGahey 2000:204; Webb 1981:16; Williams and Brain 1983:222

C-1

Date: ?

Description: A crude, medium-sized point with an extended triangular to slightly excurvate(or ovate) blade. It is roughly corner-notched, resulting in square to sloping asymmetrical shoulders. The stem is basically straight to softly contracting with a rounded to straight base that is often thinned or has cortex remaining.

Sources: none

C-2

Date: ?

Description: A crude, medium to small-sized point with an extended triangular to slightly excurvate (or ovate) blade. It is roughly corner-notched, resulting in square to sloping asymmetrical shoulders. The stem is basically straight to softly contracting with a rounded to straight base that is often thinned or has cortex remaining. Compared to C-1, it is smaller, narrower, and more elongated in appearance.

Sources: none

C-3

Date: ?

Description: A thin, medium-sized point with an extended triangular blade. There are serrations extending up the blade so that it has a sinuous appearance in a profile view. It is barbed from corner-notching and has a straight to softly contracting stem with a rounded to straight base that is often thinned or has cortex remaining.

Sources: none

Catahoula

Date: Late Woodland

Description: A small triangular, corner-notched point that is strongly barbed. The barbs extend the length of the base. The base is generally straight but can be slightly rounded or concave.

Sources: Webb 1981:14

Collins v. Claiborne

Date: Late Woodland

Description: A long and relatively wide side-notched point. The sides of the blade are roughly parallel until the mid-section when they slowly angle in to form the tip. The base is usually straight but can be slightly concave or convex. It is a wider version of Collins v. Collins.

Sources: McGahey 2000:198-200; Williams and Brain 1983:222-224

Collins v. Clifton

Date: Late Woodland

Description: A very small side-notched point with a triangular blade. The base is usually straight but can be slightly concave or rounded.

Sources: McGahey 2000:198-200; Williams and Brain 1983: 222-225

Collins v. Collins

Date: Late Woodland

Description: A long, narrow, side-notched point whose blade comes to a slim needle-like tip. The base is usually straight but can be slightly contracting or slightly bulbous.

Sources: McGahey 2000:198-200; Williams and Brain 1983:222-224

Collins v. Serrated

Date: Late Woodland

Description: A long, narrow, side-notched point whose blade comes to a slim needle-like tip. The base is usually straight but can be slightly contracting or slightly bulbous. These differ from Collins v. Collins in that there are strong serrations extending from the shoulders to the tip.

Sources: McGahey 2000:198; Williams and Brain 1983:222-224

D-1

Date: ?

Description: A crude, medium-sized point with a long, extended triangular blade. The shoulders are square and very small, and the stem rectangular. The base is straight and thick with cortex remaining, though some examples are slightly thinned. It has a longer and more triangular body than D-2.

Sources: none

D-2

Date: ?

Description: A crude, medium-sized point with a long, ovate blade. The shoulders are very small and square, leading to a stem that is roughly straight to slightly expanding. The base is softly convex and slightly thinned, though it can have a thick base with cortex remaining. Compared to D-1, the blade is more ovular-shaped, and the stem is wide relative to the blade.

Sources: none

Dalton v. Carl

Date: Paleoindian

Description: A side-notched point with a long, wide, extended triangular blade. The stem is very short and shoulders small. The base has small auricles and is shallowly concave. It has a strong resemblance to San Patrice varieties.

Sources: McGahey 2000:31-33

Edwards Stemmed v. Enola

Date: Woodland Period

Description: A thin, medium-sized point with a very long extended triangular blade with crude retouch. It is corner-notched to stemmed and may be slightly barbed. The stem is slightly contracting, and the base is relatively straight and may be thinned, although some may be thick with cortex remaining. The blade is narrower and more extended than the Sunflower variety, and the stem is often more contracting.

Sources: McGahey 2000:194; Williams and Brain 1983:225-227

Edwards Stemmed v. Sunflower

Date: Late Woodland Period

Description: A thin, medium-sized point with an extended triangular blade. There is crude retouch extending up both sides of the blade. It is corner-notched to stemmed. The shoulders are relatively square but may be slightly barbed or slightly sloping. Its stem is generally straight, and the base slightly rounded and thinned, though some have cortex remaining. Compared to Edwards v. Enola, the blade is shorter and wider, and the stem is more parallel-sided.

Sources: McGahey 2000:194; Steponaitis, personal communication; Williams and Brain 1983:225-227

Kent

Date: Late Archaic

Description: A crude, thick point with a long, extended triangular blade. There is often crude retouch on both sides of the blade. It is slightly corner-notched with roughly square shoulders that generally are asymmetrical. The stem is roughly rectangular, and the base is crudely straight and may be thinned or thick with cortex remaining. It is thicker and more rounded in profile than Edwards Stemmed points

Sources: Bell 1960:60; McGahey 2000:163; Suhm and Krieger 1954:432; Williams and Brain 1983:233-234; Webb 1981:10

Planview

Date: Paleoindian

Description: A parallel-sided lanceolate point with lateral flake scares across the blade. The sides may be slightly contracting from the mid-section. The base is concave and thinned. It does not have auricles.

Sources: Bell 1958:74; Webb 1981:4

Pontchartrain

Date: Late Archaic

Description: A thick, intricately-made dart point with a long blade that is roughly parallel-sided to extended triangular. A few examples have a curved blade so one side is convex and the other concave. It is corner-notched and may be slightly barbed. The stem is generally long and rectangular, though some are contracting. The base may be either thick with cortex remaining or rounded. The diagnostic characteristic is the fine retouch and/or serrations extending up both sides of the blade. Compared to Smithsonia, it is much thicker and more rounded in profile.

Sources: McGahey 2000:165-171; Webb 1981:9; Williams and Brain 1983:237-238

San Patrice v. unspecified

Date: Paleoindian

Description: A medium-sized point with a triangular blade that may be extended. It has strong shoulders that may be up to halfway up the point. The stem is generally side-notched but may be parallel-sided. The base is convex and may or may not have auricles.

Sources: Bell 1958:84; McGahey 2000:33-36; Webb 1981:4

San Patrice v. St. John's

Date: Paleoindian

Description: A medium-sized point with an extended triangular blade. The shoulders are very low, so the stem is short and side-notched. The base is concave and has pronounced auricles.

Sources: McGahey 2000:33-34; Webb 1981:4

Scallorn

Date: Late Woodland

Description: A small, corner-notched point with strong barbs that extend no more than halfway down the stem. The stem is expanding, and the base varies from slightly convex to slightly concave. A few examples have a small notch in the base.

Sources: McGahey 2000:202; Webb 1981:15; Williams and Brain 1983:221-222

Smithsonia

Date: Late Archaic

Description: A thin, intricate, medium-sized point with an extended triangular blade. It is corner-notched and may be slightly barbed. The stem is rectangular though it may be slightly contracting and is sometimes long relative to the blade. The base is roughly rounded or may have cortex remaining. It has intricate retouch/serrations extending up both sides of the blade. Compared to Pontchartrain, it is thinner and more triangular in form.

Sources: McGahey 2000:173-174

St. Tammany

Date: Early Archaic

Description: A large point with long, parallel sides that are very strongly serrated. The sides stop abruptly to form a diagnostic screw-driver tip. It is corner-notched to stemmed. The

stem is usually wide relative to the blade and has a straight base, but the stems can also be narrow with a straight base, expanding with a straight base, bifurcate, or rounded.

Sources: Brookes *et al.*, 2011; McGahey 2000:124-128

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Field Excavations at Feltus 2010

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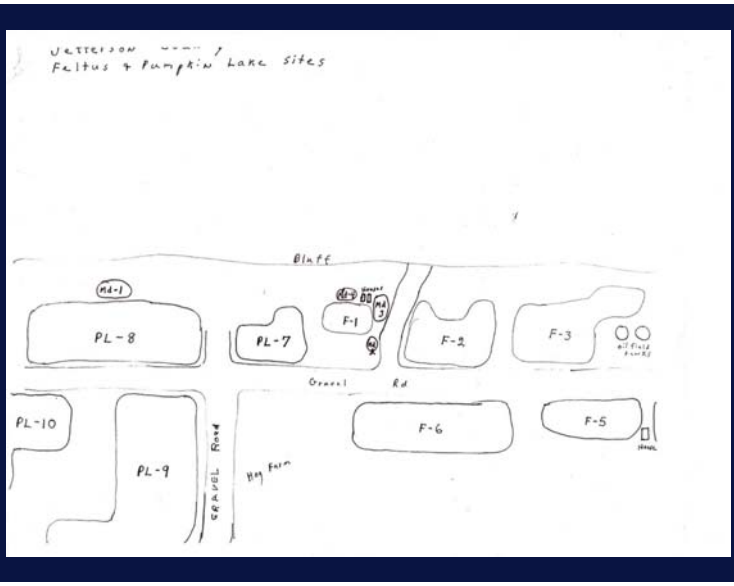


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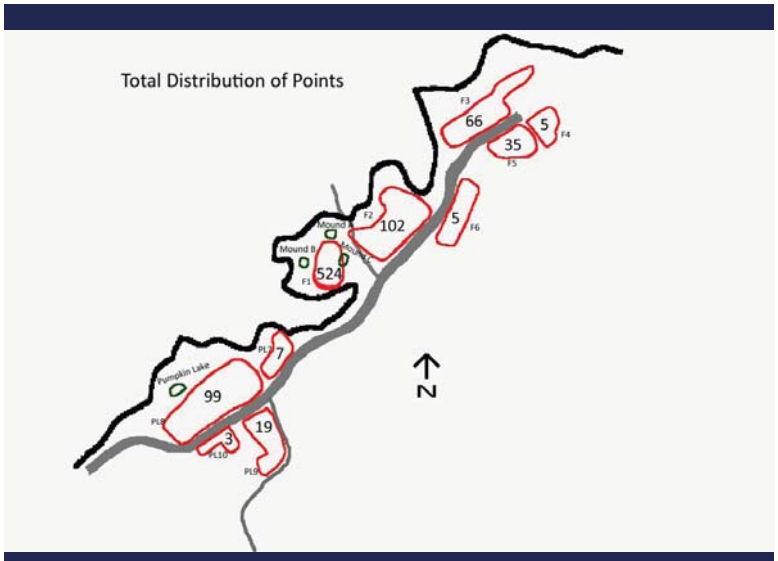
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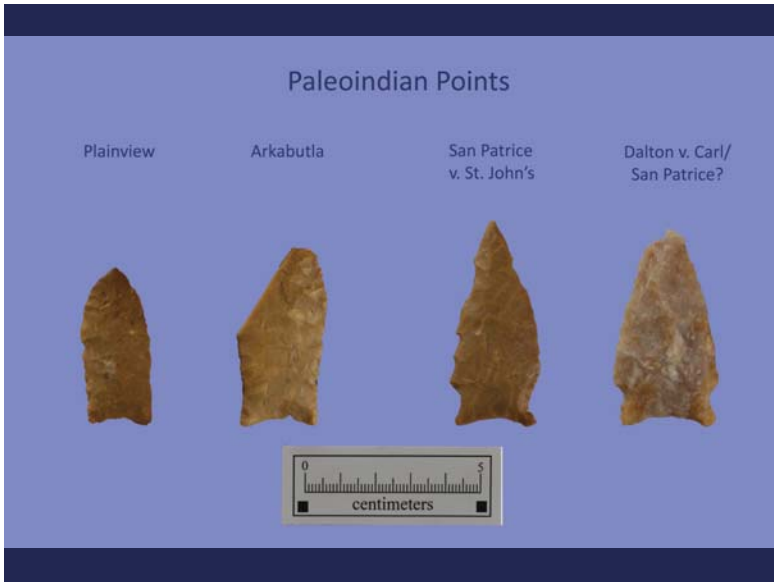
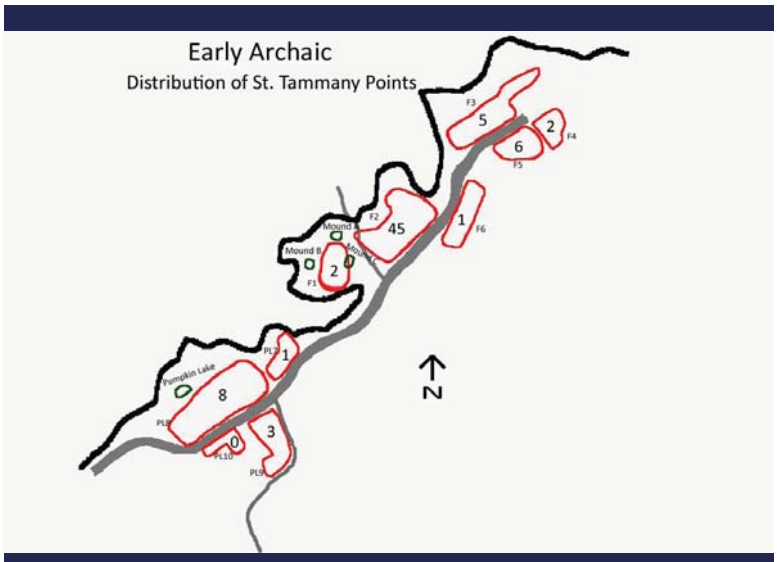

Paleoindian Points
Plainview
Arkabutla
San Patrice
v. St. John's
Dalton v. Carl/
San Patrice?
centimeters


Early Archaic Points
St. Tammany
centimeters


Early Archaic
Distribution of St. Tammany Points
5
2
6
45
1
2
1
8
3
N

Late Archaic Points

Pontchartrain

Late Archaic Points

Smithsonia

Questionable Late Archaic/Woodland Points

Kent? Edwards v. Enola? Edwards v. Sunflower?

Questionable Late Archaic Points

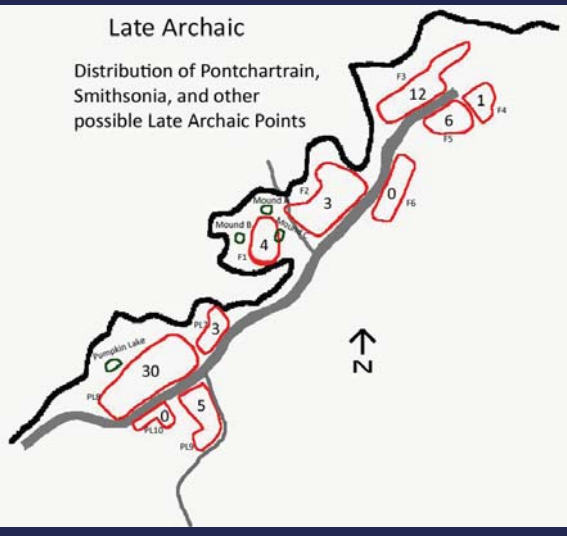
C-1? C-2? C-3?

Questionable Late Archaic Points

D-1? D-2?

Late Archaic

Distribution of Pontchartrain, Smithsonia, and other possible Late Archaic Points

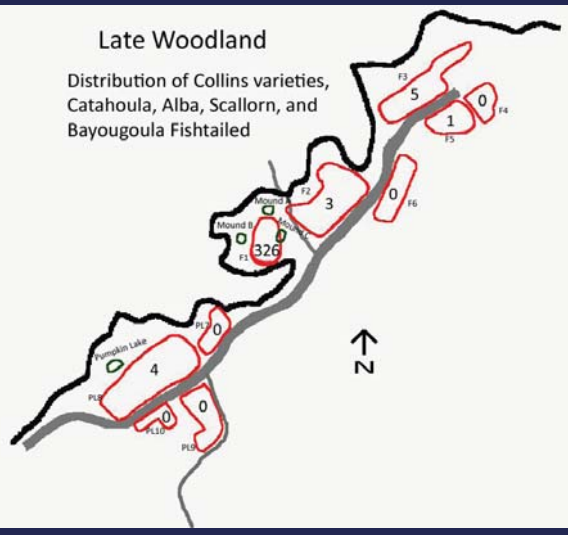


Paleoindian/Archaic Points

Unclassified

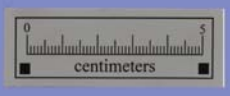
Late Woodland

Distribution of Collins varieties, Catahoula, Alba, Scallorn, and Bayougoula Fishtailed



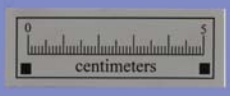
Late Woodland Points

Collins v. Collins



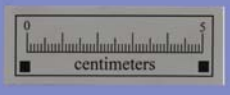
Late Woodland Points

Collins v. Claiborne



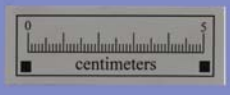
Late Woodland Points

Collins v. Clifton



Late Woodland Points

Collins v. Serrated

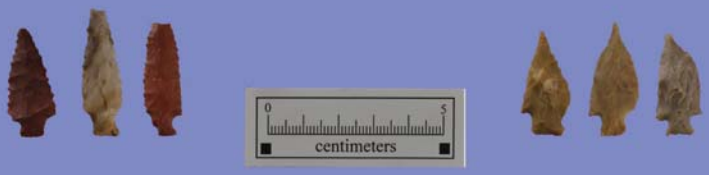


Questionable Late Woodland Points

Collins v. Clifton?

Collins v. Serrated?

Collins v. Claiborne?



Late Woodland Points

Bayougoula Fishtailed

Late Woodland Points

Alba

Late Woodland Points

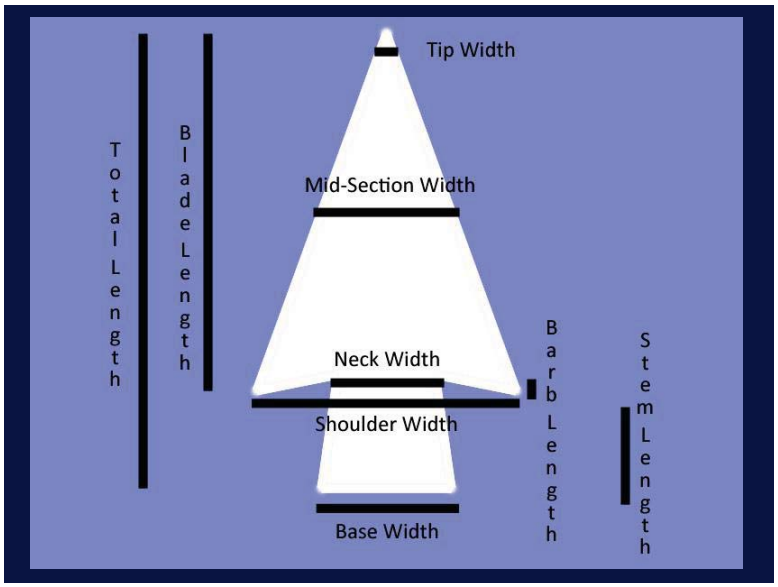
Scallorn

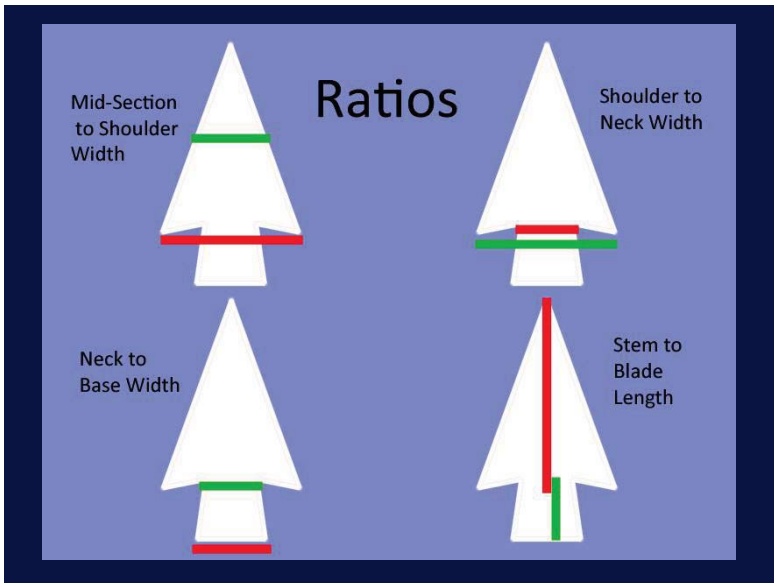
Late Woodland Points

Catahoula

Woodland Points

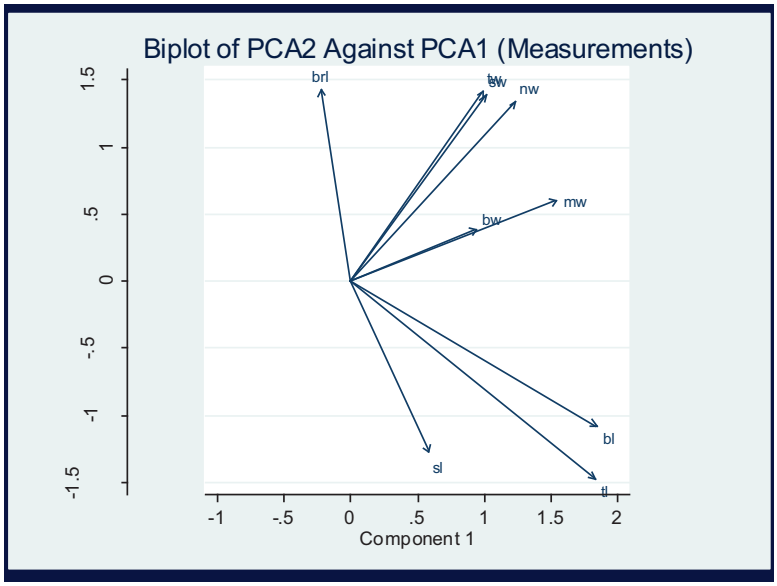
Unclassified

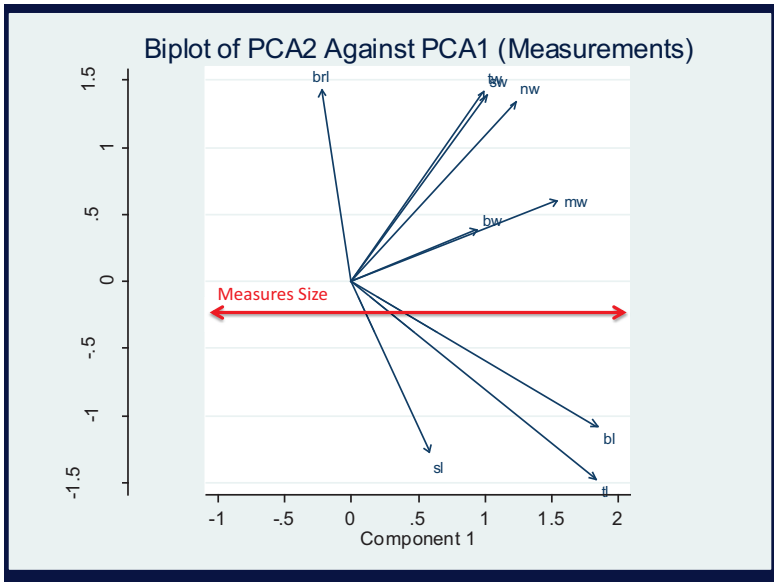


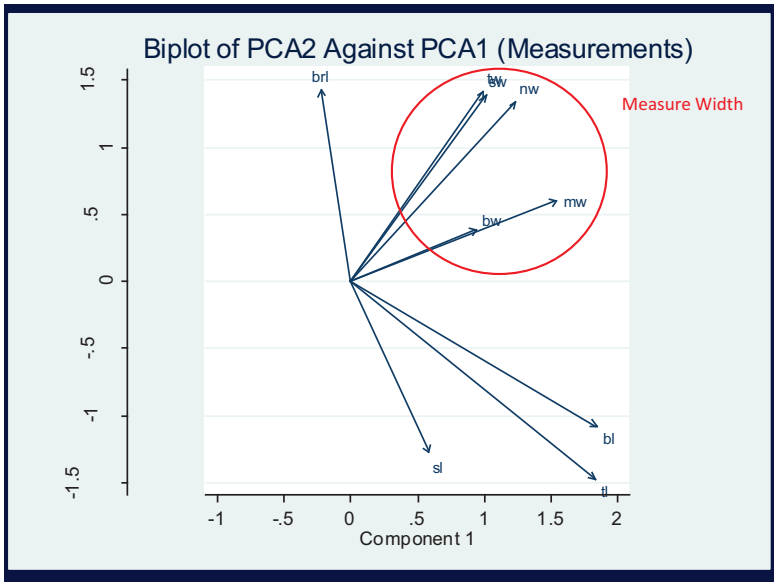


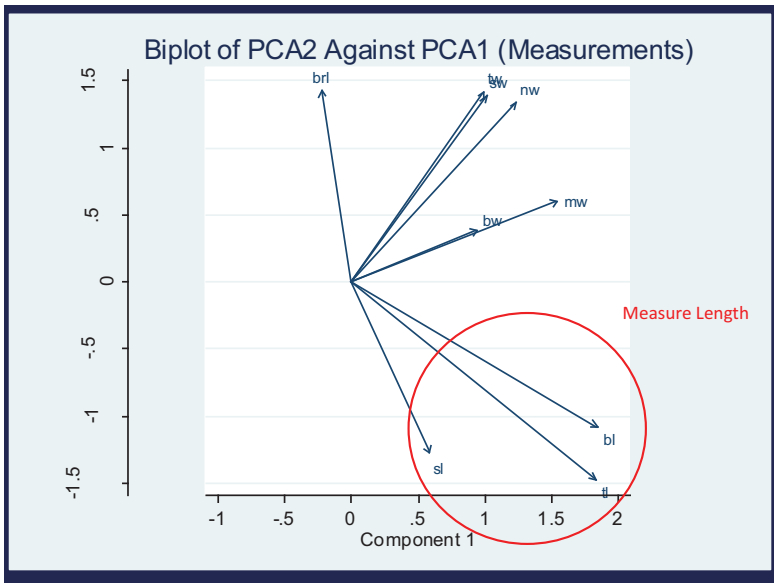
Principal component loadings (unrotated)
component normalization: sum of squares(column) = 1

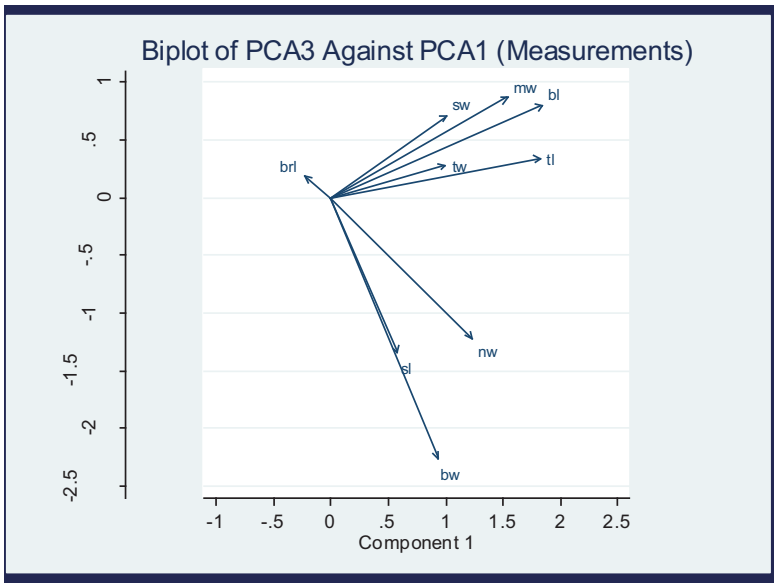
	Comp1	Comp2	Comp3	Comp4
Total Length	.4894	-.4063	-.1053	.1358
Shoulder Width	.2704	.3812	-.2199	.1059
Neck Width	.3312	.3676	.3766	-.2066
Base Width	.2506	.1065	.6964	-.02492
Blade Length	.4938	-.2962	-.2474	.1622
Stem Length	.1565	-.3506	.4126	.3743
Barb Length	-.06078	.3923	-.05615	.84
Mid-Section Width	.414	.1651	-.2674	-.2296
Tip Width	.2673	.3891	-.08741	-.04871

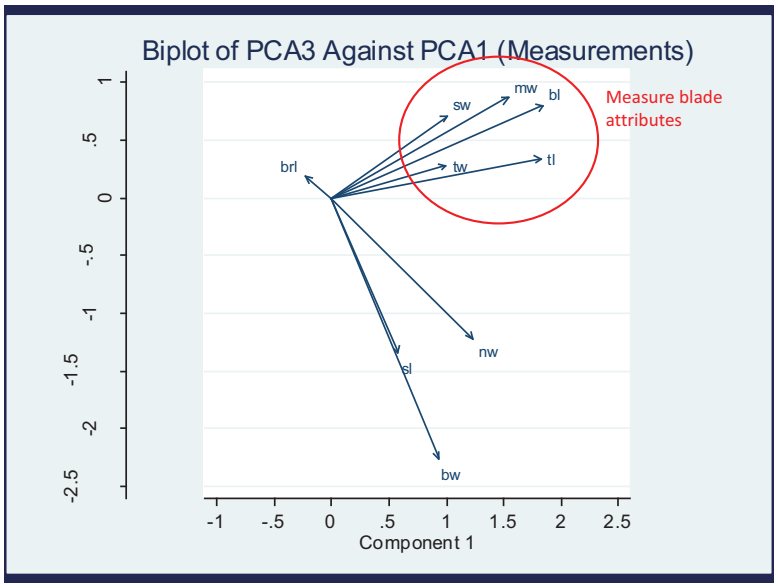


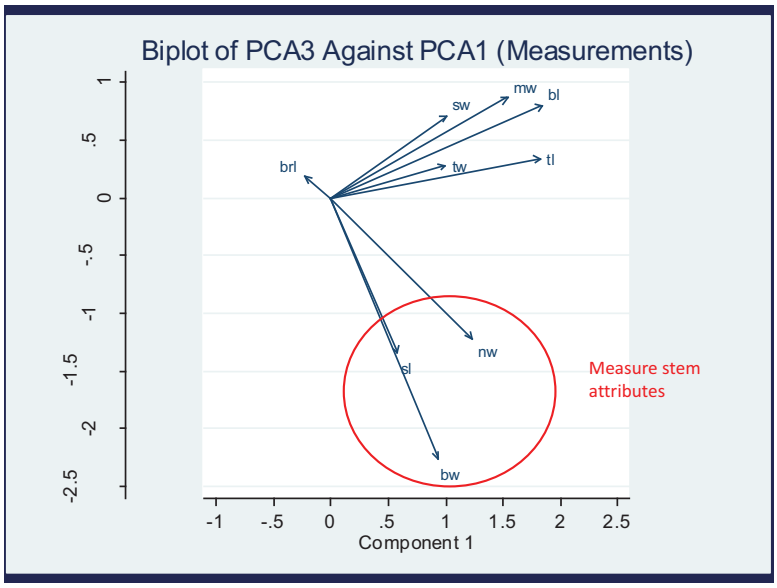


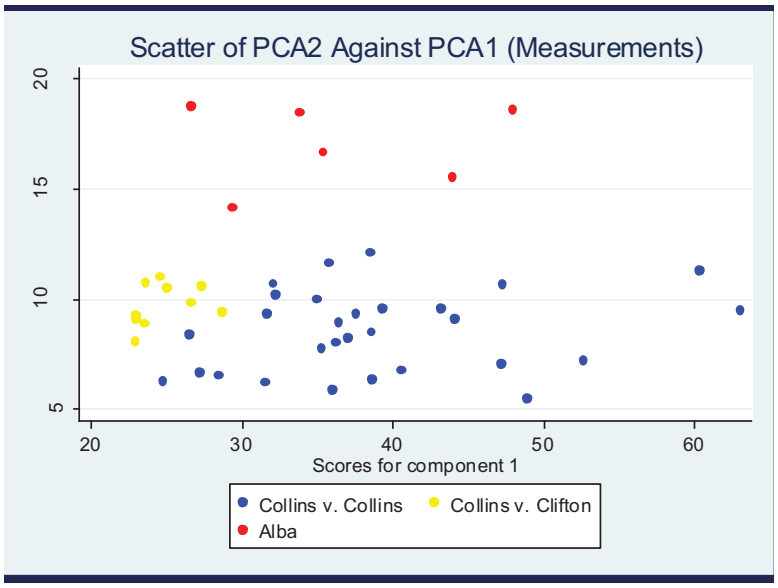


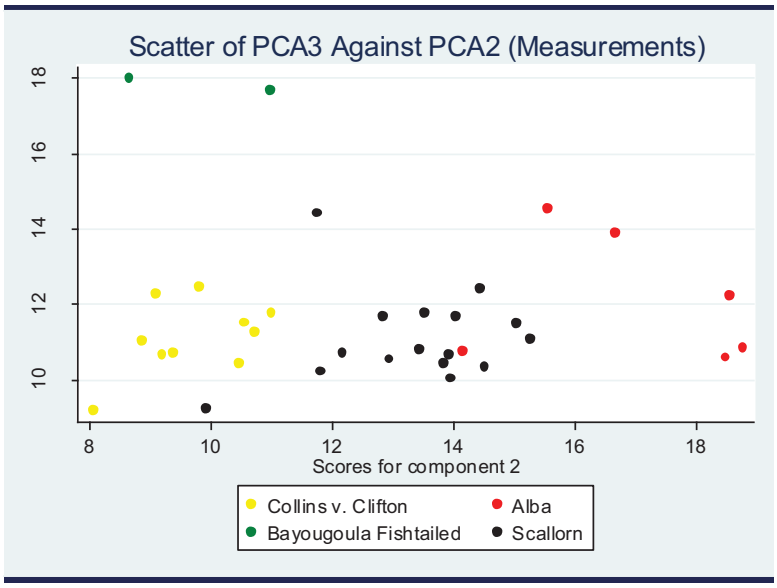

Biplot of PCA2 Against PCA1 (Measurements)
brl
sw
nw
mw
bw
bl
sl
tl
Measure Length
Component 1

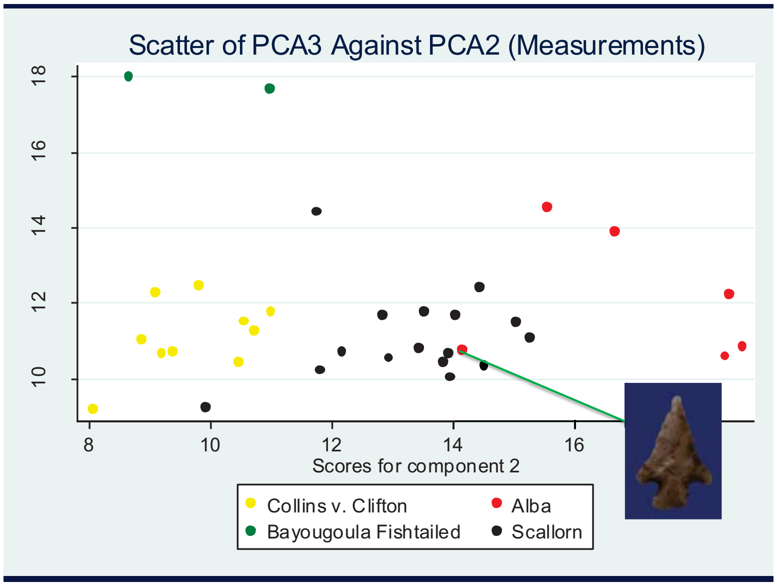

Biplot of PCA3 Against PCA1 (Measurements)
brl
sw
mw
bl
tw
tl
nw
sl
bw
Component 1

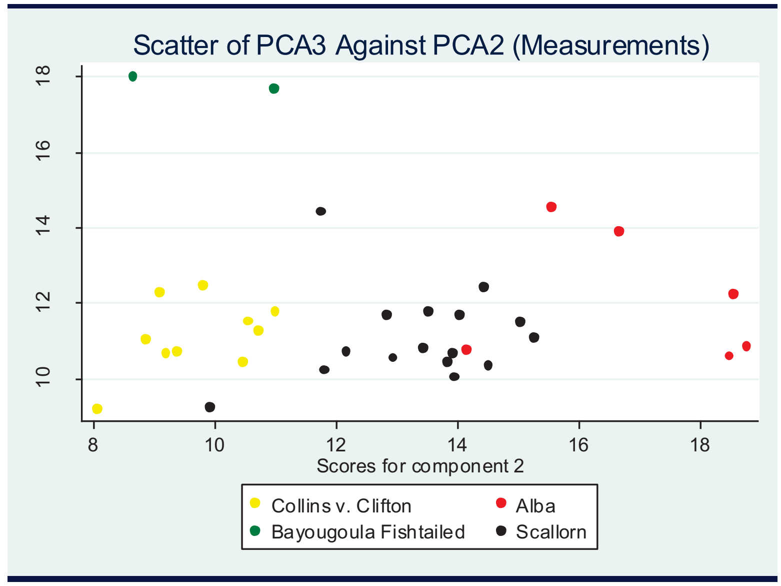

Biplot of PCA3 Against PCA1 (Measurements)
brl
sw
mw
bl
tw
tl
nw
sl
bw
Measure blade attributes
Component 1

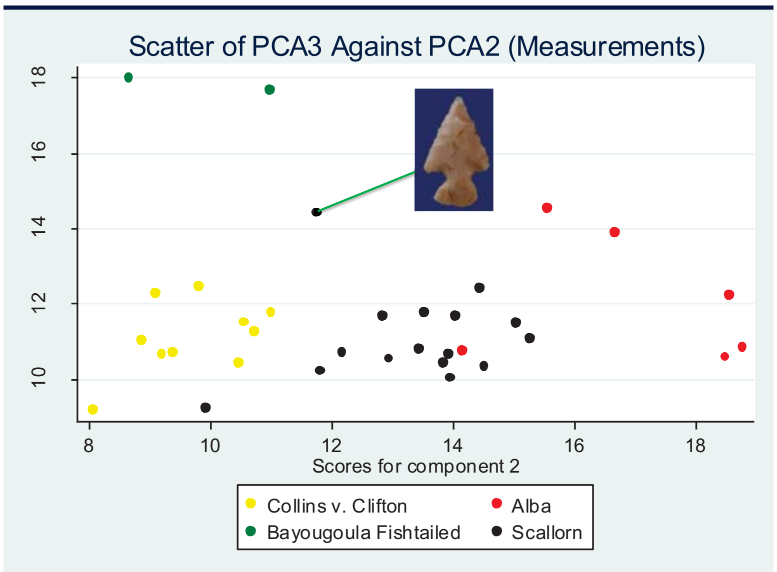

Biplot of PCA3 Against PCA1 (Measurements)
brl
sw
mw
bl
tw
tl
nw
sl
bw
Measure stem attributes
Component 1

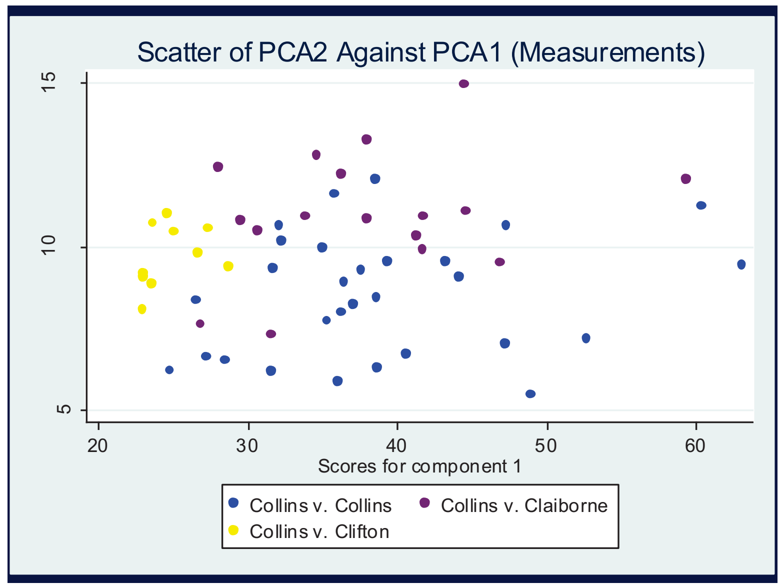

Scatter of PCA2 Against PCA1 (Measurements)
Scores for component 1
Collins v. Collins
Collins v. Clifton
Alba

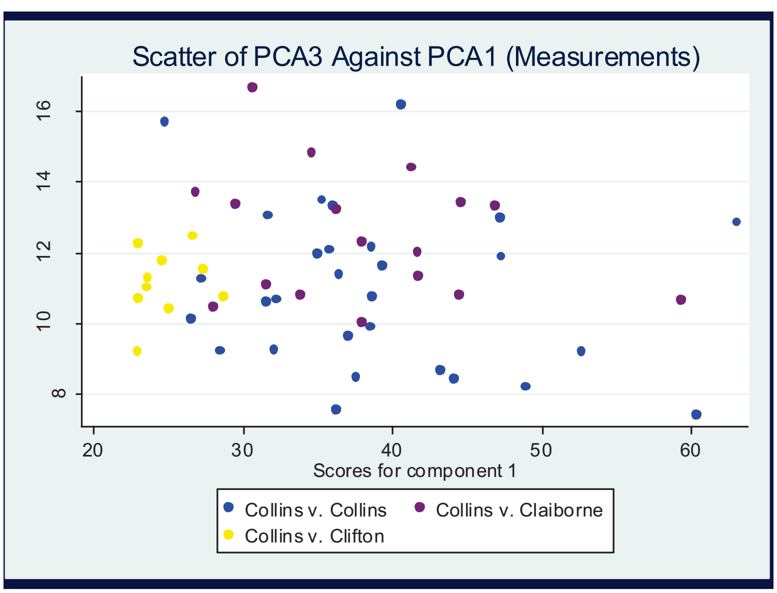

Scatter of PCA3 Against PCA2 (Measurements)
Scores for component 2
Collins v. Clifton
Alba
Bayougoula Fishtailed
Scallorn

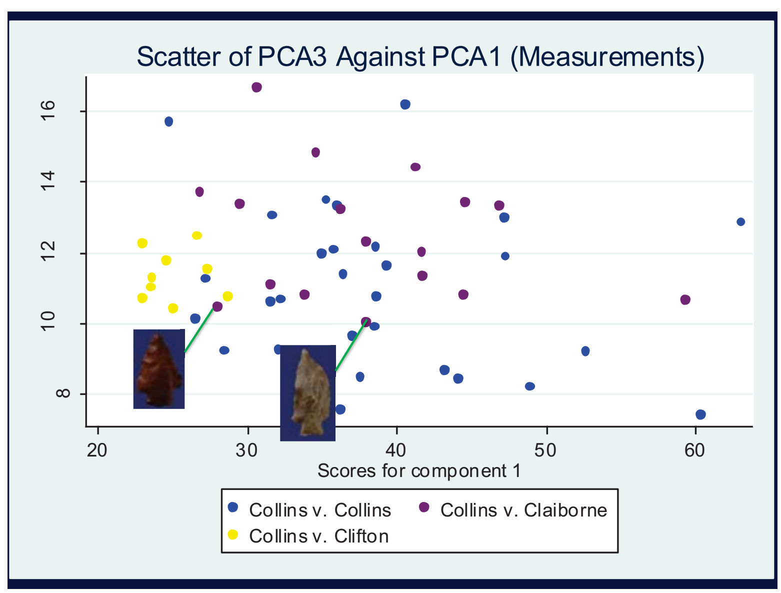

Scatter of PCA3 Against PCA2 (Measurements)
Scores for component 2
Collins v. Clifton
Alba
Bayougoula Fishtailed
Scallorn


Scatter of PCA3 Against PCA2 (Measurements)
Scores for component 2
Collins v. Clifton
Alba
Bayougoula Fishtailed
Scallorn


Scatter of PCA3 Against PCA2 (Measurements)
Scores for component 2
Collins v. Clifton
Alba
Bayougoula Fishtailed
Scallorn


Scatter of PCA2 Against PCA1 (Measurements)
Scores for component 1
Collins v. Collins
Collins v. Claiborne
Collins v. Clifton


Scatter of PCA3 Against PCA1 (Measurements)
Scores for component 1
Collins v. Collins
Collins v. Claiborne
Collins v. Clifton


Scatter of PCA3 Against PCA1 (Measurements)
Scores for component 1
Collins v. Collins
Collins v. Claiborne
Collins v. Clifton

Acknowledgements

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