**DIFFERENTIAL PERDIZ ARROW POINT MORPHOLOGY AMONG SITES, RAW MATERIALS, AND MORTUARY CONTEXTS IN THE SOUTHERN CADDO AREA**

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Sixty-four Perdiz arrow points from six Caddo sites were used in a two-dimensional comparison of projectile morphology. Results illustrate some significant differences in Perdiz projectile shape among the sites.

SITES WITH PERDIZ POINTS IN THE SAMPLE

*41CP5, Tuck Carpenter Site*

The Tuck Carpenter site is a well-studied Late Caddo period Titus phase cemetery on Dry Creek in the Big Cypress Creek basin that was inhabited by the Caddo from the 15th to the 17th century A.D. Burials with Perdiz points are the earliest in the cemetery, and likely date from ca. A.D. 1430-1500 (Perttula et al. 2017:197). A single radiocarbon date has been obtained from Burial 10: 360 + 60 B.P. Its calibrated age (using INTCal 20 and Calib 8.20) range at 2 sigma is A.D. 1442-1646, with a median probability of A.D. 1546.

Fifty seven Perdiz points have been recovered from burial features at the Tuck Carpenter site (Turner 1978, 1992; Perttula et al. 2009). A second collection from the site has an additional 18 Perdiz points from 13 of the burial features made from Ogallala quartzite and local chert gravel sources; including one that was made from a non-local novaculite (Perttula et al. 2017:Table 2)

*41CP12, Johns Site*

The Johns site is a Titus phase cemetery in the Prairie Creek valley in the Big Cypress Creek basin. No radiocarbon dates have been obtained from the site, but the decorative motifs associated with the ceramic vessels recovered from burials suggest that the cemetery was used from A.D. 1430-1600 (Perttula et al. 2010a). Forty-eight Perdiz points were recovered from 16 burial features. They were made from local chert, quartzite, and petrified gravel sources (87 percent), non-local sources (10.8 percent, mainly from Red River gravels), and chalcedony (2.2 percent).

*41CP20, B. J. Horton Site*

This ancestral Caddo cemetery in the Big Cypress Creek basin includes at least 19 burials, and two Perdiz points were recovered from burial features (Perttula et al. 2009:9).

*41HS15, Pine Tree Mound Site*

The Pine Tree Mound site is a large Titus phase mound center with associated habitation deposits, family cemeteries, and a large community cemetery (Fields and Gadus 2012). Perdiz arrow points (n = 68) represent 53 percent of the arrow points that could be typed from the site, most (n = 50) from burial contexts and the remainder from habitation deposits. Perdiz points from burial contexts tend to have been made from non-local lithic raw materials, typically chert (42 percent), while none of the non-mortuary Perdiz points are made on non-local raw material (Fields and Gadus 2012:566).

There are 92 radiocarbon dates available from the Pine Tree Mound site (Fields and Gadus 2012:Table 4.13; Selden and Perttula 2013:Table 2). Most of the calibrated dates fall between A.D. 1451-1495 and A.D. 1397-1429 (Selden and Perttula 2013:Table 3), but calibrated age ranges suggest that the settlement “was established in the A.D. 1300s and persisted until at least the mid 1600s” (Fields and Gadus 2012:299).

*41NA49, Washington Square Mound Site*

The Washington Square Mound site is located in the Angelina River basin and is a mound center with associated habitation deposits and a cemetery. Excavations in one mound uncovered two shaft tombs with abundant grave goods, but no Perdiz offerings (Corbin and Hart 1998; Perttula et al. 2010b). Fourteen Perdiz points were recovered, however, from a burial feature in the Oak Grove cemetery portion of the Washington Square Mound site (Perttula et al. 2010b:Figure 77). Another seven Perdiz points came from habitation areas near the main burial mound (Perttula 2009:Table 14); 71 percent are on gray chert of likely central Texas origin, and the remainder were made from local quartzite.

Twelve radiocarbon dates have been obtained from the Washington Square Mound site (Corbin and Hart 1998:Table 4; Selden and Perttula 2013; East Texas Radiocarbon Database), indicating use of the site in both Early (ca. A.D. 900-1200) and Middle Caddo periods. The best dates that can be associated with Perdiz points at the site range from cal. A.D. 1238-1445.

*41NA206, Spradley Site*

The Spradley site includes late 17th to early 18th century archeological deposits with European trade goods from habitation deposits in the Bayou La Nana valley in the Angelina River basin (Perttula and Marceaux 2018). Those habitation deposits, which have no associated radiocarbon dates, contain numerous Perdiz points (n = 31). Approximately 94 percent were manufactured from local silicified wood, quartzite, and gravel cherts, and the remainder are from non-local brownish-gray to translucent gray chert, likely from central Texas raw material sources (Perttula and Marceaux 2018:Table 7).

*41SA135, Jack Walton Site*

This site is located on Attoyac Bayou (Middlebrook 2010), and is an ancestral Caddo site with habitation deposits of likely Middle Caddo period age (ca. A.D. 1200-1400). There are no radiocarbon dates from the site. Excavations at the site recovered seven Perdiz points.

*41SM193, Redwine*

The Redwine site (41SM193) site is a Middle Caddo period component located 22 km from the river on a north-flowing tributary (Auburn Creek) of the Sabine River (Walters and Haskins 1998), which includes habitation deposits and a small cemetery. The site has one calibrated date of A.D. 1300-1454, at 2 sigma, with a median calibrated probability of A.D. 1356. The 11 Perdiz points from habitation deposits were manufactured on black, brown, and grayish-tan chert as well as Ogallala quartzite (Walters and Haskins 1998:14). An additional 13 Perdiz arrow points were among the grave goods recovered from two burial features (Walters and Haskins 1998:35).

*41SY43, Old Timers Site*

The Old Timers site is located in the Sabine River basin, and includes post-A.D. 1400 Late Caddo habitation deposits concentrated in the northern area of the site. Excavations recovered eight Perdiz points, all with serrated blades and made from cherts, 75 percent local gravel cherts, and an additional 25 percent of gray cherts from non-local raw material sources (Perttula 2018:77).

*41SY280, Syb’s Site*

This ancestral Caddo site of the Late Caddo Salt Lick phase is located along the Toledo Bend Reservoir, west of the now inundated Sabine River floodplain (Perttula 2018:Figure 55). It has a number of habitation clusters that include daub and fired clay from areas of burned ancestral Caddo house structures. There are no radiocarbon dates from the site, but the decorated ceramic vessel sherds in the collection areas suggest that the site relatively dates to a period beginning at A.D. 1400 through the late A.D. 1500s. Only a single Perdiz arrow point was recovered from Area 13 of the site (Perttula 2018:Table 33).

METHODS

Two-dimensional (2D) images were collected at a 600dpi resolution to produce uncompressed tiff files. Points were subsequently masked in Adobe Photoshop 2020 (v. 21.2.3), exported as jpegs, and imported to R ([R Development Core Team 2020](#_ENREF_8)), where the Momocs library was used for the subsequent elliptical Fourier analysis (EFA) ([Bonhomme, et al. 2014](#_ENREF_2)). EFA is a common tool for analyses of stone tool shape ([Gero and Mazzullo 1984](#_ENREF_3); [Iovita and McPherron 2011](#_ENREF_4); [Iovita, et al. 2017](#_ENREF_5); [Ioviţă 2009](#_ENREF_6), [2010](#_ENREF_7); [Saragusti, et al. 2005](#_ENREF_9); [Serwatka 2015](#_ENREF_10)), and provides visualizations that can be more meaningful than linear metrics alone. The outline of each projectile was retained (Figure m1), and all specimens were normalized to a common centroid, then rescaled using centroid size ([Bonhomme, et al. 2017](#_ENREF_1)). The *calibrate harmonic power* function was used to identify the number of harmonics necessary to capture Perdiz point shape ([Bonhomme, et al. 2014](#_ENREF_2)), and 11 harmonics were retained to achieve 99 percent harmonic power.



Figure m1. XY transformations for the first five principal components (90.8 percent of the cumulative shape variance).

An exploratory measure (EFA-PCA) was used to assess

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