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Mary Beth D. Trubitt

Arkansas Archeological Survey, HSU Research Station

Leslie L. Bush

Heritage Research Center, Stephen F. Austin State University

Lucretia S. Kelly

Katie Leslie

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OUACHITA MOUNTAINS FOODWAYS: PRELIMINARY RESULTS FROM 2013-2014 EXCAVATIONS AT 3MN298

Mary Beth Trubitt, Leslie L. Bush, Lucretia S. Kelly, and Katie Leslie

New excavations in the Ouachita National Forest in west-central Arkansas, co-directed by Meeks Etchieson and Mary Beth Trubitt, are resulting in significant information about foodways of ancestral Caddo Indians living in the Ouachita Mountains region. This work has focused on the Dragover site (3MN298), located on a floodplain of the upper Ouachita River (Figures 1 and 2). Artifacts from this extensive archeological site indicate use from about 6000 B.C. to the A.D. 1900s, but it was its potential for well-preserved organic material – animal bone, mussel shell, and charred plant seeds – that drew our research attention. Initial site testing in the 1980s uncovered several pit features with pottery sherds, chipped stone, animal bone, and mussel shells (Bennett et al. 1986). Later analysis of ceramics from those features indicated a Buckville phase Caddo occupation estimated to fall in the sixteenth century A.D. (Perttula 2009). Planting pine trees caused some damage to the site; one motivation for this project was the need for a current site evaluation so the Ouachita National Forest could better manage this historical location.

Figure 1. Location of Dragover and other archeological sites in the Ouachita Mountains region mentioned in text (map by Katie Leslie; base map uses World Imagery map layer from Environmental Systems Research Institute, Inc., and ESRI ArcGIS ArcMap 10.2.2).

Figure 2. View of Ouachita River in Montgomery County, Arkansas (photograph by Mary Beth Trubitt). The Central Hills, Ridges, and Valleys ecoregion of the Ouachita Mountains, formed by folded and faulted layers of sandstone, shale, chert, and novaculite, is characterized by oak-hickory-pine forest (Foti and Witsell 2013; Woods et al. 2004).

Etchieson and Trubitt (2013; Trubitt and Etchieson 2014) set out a research plan that included questions about tool stone choice, plant domestication, social identity, and culture change during the expected Archaic, Woodland, and Caddo period occupations. Excavations were conducted as a cooperative endeavor between the Arkansas Archeological Survey, the U.S.D.A. Forest Service, and the Arkansas Archeological Society, with fieldwork accomplished as part of the 2013 and 2014 Society Training Programs. Key to this research has been recovering and analyzing pottery and stone tools, architectural evidence, and food remains to interpret patterns or habits of daily life in the ancient communities. Our larger research goal is to understand relationships between Caddo Indian communities in the Ouachita Mountains and communities further away in the Arkansas and Red river valleys.

Since finishing the fieldwork, we have processed soil and flotation samples and begun analyzing artifacts, and we have received results from radiocarbon dating and specialized analyses funded by the U.S.D.A. Forest Service and by three Archeological Research Fund grants from the Arkansas Archeological Society. Preliminary results have been presented at conferences and published in several short articles (Hanvey 2014; Trubitt et al. 2014), and a summary of the dating results is anticipated (Trubitt and Leslie 2016). A children's book based on the 2013 excavations, funded by an Arkansas Heritage Month grant, was produced and distributed to area schools (Ouachita Chapter 2014), and a short description of the project appears in the "Current Research" section of the Arkansas Archeological Survey's website (Trubitt and Leslie 2015). Here, we present a summary of new findings on Caddo and pre-Caddo foodways based on Dr. Leslie Bush's archeobotanical analysis and Dr. Lucretia Kelly's zooarcheological analysis from selected cultural features at this important site.

Figure 3. In 2013 and 2014, a total of 219 m² was excavated in seven areas of the site. chert, and novaculite, is characterized by oak-hickory-pine forest (Foti and Witsell 2013; Woods et al. 2004).

Our excavations revealed cultural features such as clusters of fire-cracked rock (FCR) from dismantled cooking facilities, trash-filled pits, fire pits or hearths, and lines of postholes indicating house walls in six of the seven excavation areas (Figure 3). Soil samples from excavated features were processed using water flotation, and charred plant fragments identified by Leslie Bush were selected for radiocarbon dating. Eleven samples from features have been analyzed by Beta Analytic, Inc., using the accelerator mass spectrometry (AMS) technique, providing temporal detail on four main components or site occupations (Table 1 and Figure 4) (Trubitt and Leslie 2016). Late Archaic period use of the site is indicated by two dates from FCR clusters excavated in Area IV. A posthole, also in Area IV, yielded a Middle Woodland period date. A hearth or fire pit with burned clay and ash (F-82), now dated to the Late Woodland period, was uncovered in Area V (Figure 5). Six AMS dates establish a Late Caddo period component at the site. One of the postholes (F-71) associated with Structure 1 in Area V gave a date with a median probability of A.D. 1416. A large pit (F-97) in Area VII (Figure 6), filled with refuse including shell-tempered ceramic sherds and well-preserved animal bone and mussel shell, had an AMS date with a median probability of A.D. 1503. A portion of this feature had been dug and backfilled during the 1985 testing (as their Feature 3; Bennett et al. 1986). A line of postholes and a nearby hearth/burned clay concentration in Area I was designated Structure 2 (Figure 7); a combined sample of two AMS dates from features associated with Structure 2 has a median probability of A.D. 1560. A large trash-filled pit (F-11) excavated in Area I returned a date with a median probability of A.D. 1663 (but calibrated date ranges extending into the twentieth century). Further analysis will clarify the features assigned to each of these components and refine temporal interpretations. Here, we summarize the botanical analyses from the early (Archaic and Woodland periods) and late (Caddo period) components, and the analysis of animal bone from one Caddo period pit feature.

<i>Provenience/Context</i>	<i>Carbonized Material, Isotope Ratio (δ13C)</i>	<i>Conventional Age</i>	<i>Calibrated Date, 2 sigma (95.4%) Probability</i>	<i>Median Probability</i>
<i>Late Archaic period:</i>				
Area IV, F-2 FCR cluster, 2013-325-31, Beta 402612	hickory nutshell, -25.3 o/oo	3800 +/- 30 BP	cal BC 2339-2139 (95.4%)	cal BC 2238
Area IV, F-27 FCR cluster, 2013-325-33, Beta 386085	hickory nutshell, -25.8 o/oo	3720 +/- 30 BP	cal BC 2201-2031 (95.4%)	cal BC 2106
Late Archaic Combined (n=2)		3760 +/- 22 BP	cal BC 2280-2249 (9.5%), 2231-2219 (2.0%), 2213- 2131 (78.0%), 2085-2057 (6.0%) [T=3.6, .10 > p > .05, df=1]	cal BC 2172
<i>Middle Woodland period:</i>				
Area IV, F-34 posthole, 2013-325-56, Beta 402613	hickory nutshell, -25.1 o/oo	2140 +/- 30 BP	cal BC 353-295 (19.5%), 230-220 (1.5%), 213-88 (71.2%), 77-57 (3.2%)	cal BC 179
<i>Late Woodland period:</i>				
Area V, F-82 hearth, 2013-326-120, Beta 404379	pine bark, -26.9 o/oo	1280 +/- 30 BP	cal AD 662-774 (95.4%)	cal AD 720
Area V, F-82 hearth, 2013-326-122, Beta 386086	squash flower scar, -25.5 o/oo	1200 +/- 30 BP	cal AD 715-744 (6.2%), 765- 895 (87.8%), 928-940 (1.4%)	cal AD 825
Feature 82 Combined (n=2)		1240 +/- 22 BP	cal AD 687-779 (69.8%), 790-870 (25.6%) [T=3.6, .10 > p > .05, df=1]	cal AD 743
<i>Late Caddo period:</i>				
Area V, F-71 posthole (Str. 1), 2013-326-100, Beta 404378	squash rind, -25.6 o/oo	520 +/- 30 BP	cal AD 1324-1345 (10.5%), 1393-1443 (84.9%)	cal AD 1416
Area V, F-38 pit, 2013-326-65, Beta 364859	corn cupules, -9.6 o/oo	420 +/- 30 BP	cal AD 1427-1515 (87.9%), 1598-1618 (7.5%)	cal AD 1460
Area VII, F-97 pit (zone 4), 2014-338-75, Beta 405442	corn cupules, -9.7 o/oo	380 +/- 30 BP	cal AD 1445-1524 (61.6%), 1558-1632 (33.8%)	cal AD 1503
Area I, F-167 hearth (Str. 2), 2014-336-62, Beta 422032	corn kernel, -9.8 o/oo	370 +/- 30 BP	cal AD 1447-1528 (55.0%), 1553-1634 (40.4%)	cal AD 1515
Area I, F-122 posthole (Str. 2), 2014-336-19, Beta 422031	black walnut shell, -27.0 o/oo	330 +/- 30 BP	cal AD 1477-1643 (95.4%)	cal AD 1562
Structure 2 Combined (n=2)		350 +/- 22 BP	cal AD 1461-1529 (42.0%), 1543-1635 (53.4%) [T=0.9, .50 > p > .20, df=1]	cal AD 1560
Area I, F-11 pit, 2013-322-32, Beta 364858	corn cupules, -9.9 o/oo	240 +/- 30 BP	cal AD 1526-1557 (5.7%), 1632-1682 (51.9%), 1738- 1751 (1.3%), 1762-1803 (29.5%), 1937- (7.1%)	cal AD 1663

Table 1. Results of 3MN298 AMS dates. Conventional radiocarbon ages were reported by Beta Analytic, Inc., based on measured radiocarbon ages corrected for isotopic fractionation using delta 13C, and calibrated using the OxCal 4.2 program (Bronk Ramsey 2009, 2015; Reimer et al. 2013). Several groups of dates were combined or averaged using OxCal after testing for statistical difference (Drennan 1996:Table 13.4; Ward and Wilson 1978; see also Samuelsen 2014; Selden and Pertulla 2013).

Figure 4. Calibration probability curves (2 sigma) for 11 AMS dates from Dragover (3MN298) features, calibrated using the OxCal 4.2 program and the IntCal13 curve (Bronk Ramsey 2009, 2015; Reimer et al. 2013).

Figure 5. Feature plan for 3MN298 Area V excavations (larger numbers indicate dated features).

Figure 6. Feature plan for 3MN298 Area VII excavations. The southwest portion of Feature 97 had been dug and backfilled in 1985, but rest of this large pit was excavated as flotation samples in 2014.

Figure 7. Feature plan for 3MN298 Area I excavations.

Methods

Flotation samples from the Dragover site were processed in the field lab during the 2013 and 2014 Society Training Programs or at the Arkansas Archeological Survey's Henderson State University Research Station in a SMAP-type machine (Figure 8). Carbonized material from selected features was removed from the heavy fractions and sent to Macrobotanical Analysis along with the flotation light fractions. Funding is always limited, and a priority list of key features (pits, hearths and structure postholes, and FCR clusters) from 2013 excavation areas was drawn up by Mary Beth Trubitt for botanical analysis and dating. Well-preserved faunal material was found only in a few of the Area VII features excavated in 2014, with pit Feature 97 (Figure 9) the only context yielding a significant amount of preserved bone. A sample of animal bone sorted from heavy fraction flotation samples excavated from the west half of Feature 97 was selected by Mary Beth Trubitt and Katie Leslie, and conveyed to Lucretia Kelly for analysis. Excavation of this portion of the pit was by depth (zones 1-6 and basal), and the analysis included samples from each zone except the uppermost (possibly disturbed) zone. Mussel shell from the same feature is currently undergoing analysis by Robert Scott (Arkansas Archeological Survey) and will be reported in a future publication. A small sample of carbonized botanical material from Feature 97 has been analyzed by Leslie Bush and is included here.

3MN298 - Area VII
N 841.5 E 452
Feature 109 and Feature 97
West Wall Profile

Figure 9. Profile of Feature 109 (representing backfilled test unit) and Feature 97 (refuse pit with well-preserved faunal material).

Twenty-six flotation samples representing 638.5 cubic decimeters ("liters") of fill from 20 features were sorted according to standard procedures at the Macrobotanical Analysis laboratory in Manchaca, Texas (Pearsall 2000). Heavy and light fraction materials were combined prior to size-sorting through a stack of graduated geologic mesh for ease of identification. Materials that did not pass through the No. 10 mesh (2 mm square openings) were completely sorted under a microscope at 7-45 X, and all carbonized and semi-carbonized botanical remains were counted, weighed, recorded, and labeled. Materials that fell through

Figure 8. Katie Leslie processes soil samples from 3MN298 features using water flotation method at the Survey's HSU Research Station (photograph by Mary Beth Trubitt). The "heavy fraction" was caught on 1.0 mm mesh screen in the tank and the "light fraction" flowed out to be caught in the 0.25 mm mesh.

the 2 mm mesh ("residue") were examined for carbonized and semi-carbonized botanical remains not previously identified in the larger size fraction. Wood charcoal identification was attempted for 20 specimens selected at random from those larger than 2 mm from each sample. Botanical materials were identified to the lowest possible taxonomic level by comparison to materials in the Macrobotanical Analysis comparative collection and through the use of standard reference works (e.g., Core et al. 1979; Davis 1993; Hoadley 1990; InsideWood 2004-onwards; Martin and Barkley 1961; Panshin and de Zeeuw 1980; Wheeler 2011). Plant nomenclature follows the PLANTS database (USDA, NRCS 2015).

All animal bone in this study was identified by direct comparison to modern osteological collections in Lucretia Kelly's laboratory or housed at the Illinois State Museum Records and Research Facility in Springfield, Illinois. Identification of the faunal remains was made to the most specific taxonomic level possible, given the completeness and portion of the bone present. Nomenclature follows the Integrated Taxonomic Information System (www.itis.gov). If a bone could be only tentatively identified to a certain taxon, it was given a "cf." designation. As is common in zooarcheology (Driver 1992; Reitz and Wing 2008; Uerpmann 1973), when a mammal or bird bone cannot be identified to a taxon more specific than class, it is placed in a size category where possible. The categories of large, medium, and small are based on the size of the major bones in a skeleton. For each bone identifiable to the level of class or to a more specific taxon, recorded information included element name, side, portion present and completeness, epiphyseal fusion, tooth wear and eruption, and type and placement of modification (weathering, gnaw marks, cut marks, staining, and burning). For the deer bone, locations of cut marks were recorded to aid interpretation of butchery techniques. Epiphyseal fusion and tooth eruption and wear can be used to calculate the relative age of deer (Gilbert 1990; Purdue 1983; Reitz and Wing 2008; Severinghaus 1949).

Following standard zooarcheological quantification practices, both NISP (number of identifiable specimens) and MNI (minimum number of individuals) are used here. For NISP, if two or more fragments could be glued or fitted together, they were counted as one (except teeth are counted separately even if still in the mandible or maxilla, for possible calculation of food utility indices). MNI was figured for each species for the feature as a whole because of potential mixing throughout the feature. MNI was calculated by counting the most frequently-occurring element after dividing lefts from rights. Completeness, portion, age, and, in some cases, size were taken into consideration.

Results: Botanical Remains from Early Components in Areas II, IV, and V

Fifteen flotation samples (302.4 cu. dm.) from ten features from Areas II, IV, and V were analyzed for macrobotanical remains (Table 2). Seven of these are interpreted as Late Archaic or Woodland period (Fourche Maline) features, including several that have now been AMS dates (two FCR clusters from Area IV with a combined median probability of 2172 B.C., a posthole from Area IV with a median probability of 179 B.C., and a hearth from Area V with a combined median probability of A.D. 743). Three additional postholes from Area IV that may be from either Fourche Maline or Caddo components are also discussed here based on the absence of cultivated plant remains and small seeds. With the exception of the Area V hearth, botanical materials from these features are similar, characterized by sparse wood charcoal and moderate quantities of nutshell. Feature 82 contained a large amount of wood charcoal as well as squash, the earliest cultigen identified from the site, several small seeds from wild plants (sida, spurge), and a fragment of cane.

Accession/FSN	2013-325-21, 24, 31	2013-325-22	2013-325-33, 79, 96	2013-325-101	2013-323-59	2013-325-56	2013-325-57	2013-325-52	2013-325-78	2013-326-120, 122	
Area / Feature	IV, 2	IV, 4	IV, 27	IV, 67	II, 58	IV, 34	IV, 35	IV, 36	IV, 39	V, 82	
Description	FCR cl.	FCR cl.	FCR cl.	FCR cl.	FCR cl.	Posthole	Posthole	Posthole	Posthole	Hearth	
Component (bold indicates AMS dated)	LA	LA-FM	LA	LA-FM	LA-FM	FM	FM/Cad	FM/Cad	FM/Cad	FM	Total
Sample volume (cu. dm.)	50.6	22	97	7.5	13	1	0.5	2.5	1	107.3	302.4
Squash (<i>Cucurbita</i> sp., flower scar)											
Shells											
Hickory (<i>Carya</i> sp., thick-shelled)	63	15	163	6		3	2	1	1	0.02	1
Black walnut (<i>Juglans nigra</i>)				0.08				0.04	0.01	0.68	280
Hickory-walnut family (Juglandaceae)	24	12	15	3		1			2	0.02	1
Hazelnut (<i>Corylus americana</i>)				0.02	1					0.06	62
Acorn (<i>Quercus</i> sp.)		4	1			1				0.04	1
Small seeds (wt. < 0.1g)										0.01	7
Syringe family (Euphorbiaceae)											
Sida (<i>Sida</i> sp.)											1
Indeterminate											3
Stems											
Carex (<i>Andropogon</i> sp.)											1
Small grass (Poaceae)											1
cf. Greenbrier stem (<i>Smitax</i> sp.)			2							0.01	1
Wood charcoal											2
Red group oak (<i>Quercus</i> sect. <i>Lobatae</i>)		1			5					0.37	31
White group oak (<i>Quercus</i> sect. <i>Quercus</i>)	3	4	4		2			1	0.01	0.08	23
Oak, unspecified (<i>Quercus</i> sp.)	8	2	7	0.01	2	4	1		3	0.02	28
Pine (<i>Pinus</i> sp.)	7	4	24	1	2	1	1		1	0.1	45
Hickory (<i>Carya</i> sp.)		1		0.01	1						2
Ash (<i>Fraxinus</i> sp.)			9								9
Beech (<i>Fagus grandifolia</i>)			1							0.04	1
Black walnut (<i>Juglans nigra</i>)					1						1
Redcedar (<i>Juniperus virginiana</i>)									1		1
Sweetgum (<i>Liquidambar styraciflua</i>)					1						1
Hardwood, indeterminate	7	2	2			2			4	0.34	17
Indeterminate										0.06	4
Not examined for species			24							1330	1354
Other pine parts										28.06	28.26
Pine needles (<i>Pinus</i> sp.)	7	4	4								16
Pine resin (<i>Pinus</i> sp.)	7	2	11	0.33	1	1	1		2	0.03	28
Other plant parts (and fungus)											
Bark	1		9								20
Fungus		1								0.11	0.17
Starchy fragments										0.05	7
Fruit											1
Indeterminate	1	3	14	0.06	1					0.01	1
Contamination > 2 mm	14.06	6.65	27.73	1.05	4.54					0.04	26
Residue < 2 mm	26.81	11.24	74.34	10.63	3.55	0.23			0.11	20.65	75.25
									0.19	106.75	234.06

Table 2. Carbonized Plant Remains from 3MN298, Early Components (number of specimens/weights g).

Wood charcoal

There were 1517 fragments of wood charcoal weighing 30.57 g recovered from early component flotation samples; these are interpreted as fuel wood. Of the 163 fragments for which identification was attempted, 142 could be assigned to genus or species: 82 specimens (58 percent) were oaks, and 45 (32 percent) were pine. Much of the pine came from soil in/around Feature 27, a Late Archaic FCR concentration. Oak predominated in the Feature 82 hearth fill. Little wood charcoal was present in the four postholes (Features 34, 35, 36, and 39), and most had at least two types of wood as well as nutshell. Plant remains in the postholes are interpreted as general site debris rather than primary construction material.

Nut resources

A total of 351 fragments of nutshell (5.74 g) was recovered from the early features at Dragover. The nutshell is dominated by thick-shelled hickory and Juglandaceae nutshell consistent with hickory (98 percent by weight), but seven fragments of acorn, one of black walnut, and one of hazelnut were also present. Nut uses and nutritional properties are discussed in more detail below. Fats available in the nut resources would have been particularly important to hunter-gatherers who relied on lean meat for a portion of the year (Hall 2000).

Greenbrier vine

A Late Archaic FCR concentration (F-27) produced two fragments of a monocot stem anatomically consistent with greenbrier, a thorny, thicket-producing vine. Greenbrier has several food uses. Its young shoots are particularly tasty raw or sautéed, and they are also edible after boiling. The bland berries, although not terribly palatable, are at least not toxic to humans (Tull 2013). Historic records of aboriginal greenbrier uses focus on the starchy tubers. Cherokees, Choctaws, and Houma people of Louisiana dried greenbrier tubers and ground them into flour (Moerman 1998). Intriguingly, Melvin Gilmore (1933:126) records greenbrier vines as the main ingredient in a decoction that, when sprinkled on the bed of a couple, would cause them to quarrel and possibly separate. Greenbrier vines were also used in Native basketry in California (Moerman 1998).

Squash

The only possible domesticated plant identified in early component features at Dragover was squash recovered from Feature 82, a hearth or fire pit with ash deposits excavated in Area V. The squash flower scar, sometimes called a torus (Figure 10), has been directly dated and returned a 2-sigma calibrated age range of A.D. 715-940, with a median probability of A.D. 825. Although domestication status cannot be assessed from the flower scar, wild cucurbits are not reported for the Ouachita Mountains, making the squash either a domesticate or an import (Gentry et al. 2013; Smith 1992:82). Domesticated squash and gourd have been found in Late Archaic to Early Woodland period contexts in the Ozarks and in Woodland period components in East Texas (Fritz 1990; Pertulla 2008), but domesticated plants have rarely been documented at sites in the Ouachita Mountains before the Caddo period (see Leith 2011 for discussion of Fourche Maline subsistence patterns on the northern edge of the Ouachitas in Oklahoma).

Figure 10. Carbonized plant remains identified from 3MN298 features: top left, squash flower scar from Feature 82 (2013-326-122), scale in mm; top right, common bean fragment from Feature 11 (2013-322-32), scale in mm; bottom left, hickory nutshell from Feature 97 (2014-338-75), scale in cm; bottom right, maypop seed from Feature 11 (2013-322-32), scale in mm (photographs by Leslie Bush).

Results: Botanical Remains from the Late Component in Areas I, III, V, and VII

Eleven flotation samples (336.1 cu. dm.) from ten features assigned to the Caddo component in Areas I, III, V, and VII were analyzed for macrobotanical remains (Table 3). Nearly three-quarters of the flotation volume of the Caddo samples comes from Feature 11, a seventeenth century pit from which 235.5 cu. dm. of fill were processed and analyzed. Features interpreted as belonging to the Caddo component at Dragover include several different domesticated plants, a variety of small seeds from wild plants, and cane, in addition to nutshell and wood charcoal.

Accession/YSN	2013-324-111	2013-326-25	2013-326-65	2013-322-74	2013-326-100	2013-326-101	2013-326-111	2013-326-126	2013-322-32, 69	2014-338-75										
Area / Feature	III, 8	V, 10	V, 38	I, 60	V, 71 (Str. 1)	V, 72 (Str. 1)	V, 77 (Str. 1)	V, 88 (Str. 1)	I, 11	VII, 97										
Description	Midden	FCR cl.	Pit	Posthole	Posthole	Posthole	Posthole	Posthole	Pit	Pit										
Component (bold indicates AMS dated)	Caddo	Caddo	Caddo	Caddo	Caddo	Caddo	Caddo	Caddo	Caddo	Caddo	Total									
Sample volume (cu. dm.)	30.5	12	38	2	3.9	0.8	1.5	3.9	235.5	8	336.1									
Corn (<i>Zea mays</i>), cobs and glumes			15	0.08	2	0.01			1	0.01	55	0.56	18	0.16	91	0.5				
Corn (<i>Zea mays</i>), kernel		2	0.03	1	0.05				5	0.05	19	0.2	6	0.08	33	0.4				
Squash (<i>Cucurbita</i> sp.), rind					3	0.04									3	0.03				
Common bean (<i>Phaseolus vulgaris</i>)									1	0.01					1	0.01				
Nutshell																				
Hickory (<i>Carya</i> sp., thick-shelled)	2	0.01	3	0.04	27	0.83	10	0.11	9	0.17	3	0.09	4	0.1	2899	63.74	63	2.9	3020	67.9
Black walnut (<i>Juglans nigra</i>)			2	0.06											12	0.58	14	0.6		
Hickory-walnut family (Juglandaceae)		2	0.03	4	0.06	1	0.01		2	0.01	397	3.25	9	0.14	415	3.5				
Hazelnut (<i>Corylus americana</i>)									5	0.07	1	0.02	6	0.09						
Acorn (<i>Quercus</i> sp.)				2	0.02				14	0.05	1	0.01	17	0.08						
Small seeds (wt. < 0.01g)																				
Chenopodium (<i>Chenopodium</i> sp.)													22		22					
Purple passionflower (<i>Passiflora incarnata</i>)									1	0.01	3	0.24	4	0.2						
Ragweed (<i>Ambrosia</i> sp.)			2						1						3					
Sandmat (<i>Chamaecypar</i> sp.)			2										2							
Cheno-am (<i>Chenopodium/Amaranthus</i> spp.)	2														2					
Hawthorn (<i>Crataegus</i> sp.)									2	0.02			2	0.02						
Legume family (Fabaceae)								2					2							
Strawberry (<i>Fragaria</i> sp.)								1					1		2					
Purdane (<i>Portulaca oleracea</i>)								1					1		2					
Vervain (<i>Verbena</i> sp.)													2		2					
Daisy family (Asteraceae)									1				1		1					
Chenopodium (<i>Chenopodium cf. berlandieri</i> spp. <i>juncianum</i>)								1					1		1					
Stick-tight (<i>Gallium</i> sp.)									1				1		1					
Morningglory (<i>Ipomoea</i> sp.)									1				1		1					
Burclover (<i>Medicago</i> sp.)													1		1					
Smartweed (<i>Polygonum</i> sp., lenticular)									1				1		1					
Grape (<i>Vitis</i> sp.)									1				1		1					
Indeterminable								4	2		5	0.06	11	0.06						
Stems																				
Cane (<i>Arundinaria</i> sp.)	5	0.01	2	0.01	1	0.01	2	0.03	1	0.01	4	0.01	9	0.06	40	0.35	64	0.4		
Small grass (Poaceae)									5	0.01			5	0.01			5	0.01		
Herbaceous	2	0.01													2	0.01				
Wood charcoal																				
Red group oak (<i>Quercus</i> sect. <i>Lobatae</i>)	4	0.04	1	0.01	3	0.02	4	0.04	3	0.01			3	0.04	5	0.05			23	0.2
White group oak (<i>Quercus</i> sect. <i>Quercus</i>)			10	0.25	5	0.05	4	0.02			19	0.22	8	0.53	46	1.0				
Oak, unspecified (<i>Quercus</i> sp.)			1	0.01	1	0.01					11	0.22			13	0.22				
Pine (<i>Pinus</i> sp.)			4	0.07	9	0.15	1	0.01	2	0.01	2	0.02	12	0.24	12	0.58	42	1.0		
Hickory (<i>Carya</i> sp.)				1	0.01				11	0.02	1	0.02	1	0.02	14	0.0				
Ash (<i>Fraxinus</i> sp.)	12	0.25							1	0.01				13	0.2					
American elm (<i>Ulmus americana</i>)	4	0.07									1	0.01		5	0.03					
Elm (<i>Ulmus</i> sp.)									1	0.01				1	0.01					
American hornbeam (<i>Carpinus caroliniana</i>)									1	0.14				1	0.1					
Kentucky coffeetree (<i>Gymnocladus dioica</i>)		1	0.02												1	0.0				
Hollyhock (<i>Ilex</i> sp.)									1	0.01				1	0.01					
Redcedar (<i>Juniperus virginiana</i>)					1	0.01								1	0.01					
Hardwood, indeterminable		2	0.01			1	0.01				1	0.01			4	0.0				
Not examined for species	440	4.14		74	1.43	9	0.04		28	0.22	1893	24.59	394	9.13	2838	39.5				
Other pine parts																				
Pine cone scales (<i>Pinus</i> sp.)											2	0.01			2	0.0				
Pine needles (<i>Pinus</i> sp.)											5	0.01			5	0.0				
Pine resin (<i>Pinus</i> sp.)	1	0.01		1	0.07				52	0.75	21	0.29	75	1.3						
Other plant parts (and fungus)																				
Bark			69	1.02					6	0.1	41	0.36	4	0.03	120	1.5				
Fungus	22	0.13											4	0.02	26	0.1				
Starchy fragments											4	0.03			4	0.0				
Tuber													1	0.58	1	0.5				
Grass rhizome (Poaceae)									1	0.01				1	0.0					
Root											1	0.03			1	0.0				
Indeterminable			5	0.03		1	0.01		3	0.01	119	1.91	48	0.44	176	2.2				
Contamination > 2 mm	16.82	1.95	10.61	0.2	0.61	0.04	0.05	0.2	39.4	148.59	218.47									
Residue < 2 mm	21.06	2.49	8.02	0.33	0.54	0.37	0.08	0.96	55.15	338.8	427.8									

Table 3. Carbonized Plant Remains from 3MN298 Flotation Samples, Late Component (number of specimens/weight g).

Agricultural products

Several crop plants were recovered from late component features at the site. Six of the features produced corn, one contained squash rind (F-71), one (F-11) yielded a fragmentary common bean, and one (F-88) had a domesticated-type chenopodium seed (goosefoot). Corn consisted of loose kernels and kernel fragments (five features) and cupules and glume fragments (five features). In addition, the fragmentary tip of a corn cob was recovered from the east half of Feature 97 (2014-338-21) (Figure 11). Measurements were made of loose corn cupules and the cupules attached to the Feature 97 cob. Loose cupules from Features 11, 38, and 97 had a mean width of 4.3 mm (range 2.5-7.25, n=36) and a mean height or thickness of 1.8 mm (range 1.1-2.9, n=36). The cob fragment had mean cupule widths between 3.9-4.6 mm and mean cupule heights between 2.6-2.8 for the 6 ranks measured. The cob held 12 rows of kernels and was 11.1 mm in diameter at the broken end, as measured between the apical notches of lower glumes on opposite sides of the cob (Bird 1994). Corn from 4 features was directly dated using AMS, returning calibrated median probabilities of A.D. 1460, 1503, 1515, and 1663.

Three pieces of squash rind were recovered from posthole Feature 71, associated with Structure 1. These rind fragments are 2.3-2.5 mm thick, sufficient to meet the “King’s Rule” criterion for domestication (Smith 1992:41). They were directly dated using AMS and returned a 2 sigma calibrated age range of A.D. 1324-1443, with a median probability of A.D. 1416. A bean fragment was recovered from Feature 11, a seventeenth century pit (see Figure 10). This age is consistent with the late (post-A.D. 1250) introduction of beans into agricultural systems in the eastern United States (Hart and Scarry 1999).

Cane

Fragments of cane stem were recovered in eight of the ten features assigned to the Caddo component at Dragover (as well as in the Woodland period hearth Feature 82 from Area V). Cane (*Arundinaria* sp.) is the only North American member of the bamboo tribe, a woody group of the grass family (Diggs et al. 2006:836). A facultative wetlands plant, it grows in moist woods and low areas generally (USDA, NCRS 2015). Although cane is rare today, it was once far more abundant (Jurney 2012). Native people used cane in many items, including mats, baskets, screens to divide rooms, spear shafts, arrow shafts, pipe stems, blow guns, flutes, and blow tubes used in healing (Moerman 1998:104). Henri Joutel mentions use of cane for torches (Foster 1998:235). Historic accounts of the Hasinai Caddo in East Texas by Francisco Hidalgo, Fray Francisco Casañas de Jesús María, and Isidro Félix de Espinosa all mention baskets or boxes that they describe as made of reed (Hatcher 1927a:56, 1927b:156), probably referring to cane. The larger cane baskets in Caddo country were used to contain crops in storage areas, and loosely woven baskets were useful in sifting and winnowing (Swanton 1996:157).

Nutshell

A total of 3,472 fragments of nutshell (72.30 g) was recovered from the late component features analyzed from Dragover. Nutshell consisted primarily of thick-shelled hickories (see Figure 10), but black walnut, hazelnut, and acorn fragments were also found. Nutritionally, hickory nuts are similar to walnuts, and both are more similar to hazel than to acorn. Acorn is intermediate in fat and starches between the other tree nuts and starchy seeds such as corn (USDA, ARS 2014).

Figure 11. Corn from 3MN298: top, corn kernels from Feature 11 (2013-322-32), scale in mm; bottom, corn cob fragment from Feature 97 (2014-338-21), scale in cm (photographs by Leslie Bush).

Traditional hickory nut processing methods used by Cherokees, Choctaws, and members of many other tribes involves pounding the nuts into small pieces and then heating them in water, where the oil can be skimmed off, the nutmeat retrieved from suspension, and the shells allowed to sink to the bottom (Fritz et al. 2001; Moerman 1998). Experiments by archeologists show that this process yields a much larger number of calories per labor invested than does cracking and picking (Talalay et al. 1984:353). Other oily nuts cannot be processed in this manner because either their meats sink along with the shells (hazelnut) or the nuts become bitter (walnut).

Other wild plants

Seeds of wild plants identified in late component features include several from edible fleshy or dry fruits: strawberry, maypop (fruit of the purple passionflower, see Figure 10), grape, and hawthorn. Purslane has edible greens. Other plant seeds may be incidental inclusions (sandmat) or medicinal plants (verbena).

The 22 *Chenopodium* seeds from Feature 97 fall at the large end of the size range for this genus. At 1.6-2.0 mm in diameter, the seeds compare well to the reported dimensions of 1.3-1.9 mm for *Chenopodium simplex* and 1.7-2.0 mm for *C. berlandieri* var. *bushianum* (Clemants and Mosyakin 2003). Both species are native to Arkansas, although it is not clear whether var. *bushianum* is included in the Arkansas *C. berlandieri* species (Gentry et al. 2013). Testa thickness has not been measured for chenopodium at the site, but the Feature 97 specimens appear subjectively to be the thick, wild type. The single specimen from Feature 88, in contrast, is consistent with the domesticated variety *Chenopodium berlandieri* spp. *jonesianum* in having a thin testa and truncate margin morphology; it is 1.3 mm in maximum diameter. Thin seed coats sometimes occur in wild populations of chenopodium (Smith 1992:148-149), so the domestication status of all chenopodium in the late component at Dragover cannot be determined from a single specimen. Nonetheless, the presence of a domestic type chenopodium indicates an avenue for future research at the site.

Wood charcoal

A total of 3,003 fragments of wood charcoal (42.78 g) was recovered in the late component feature samples. Of the 165 fragments for which identification was attempted, 161 could be assigned to genus or species: 82 specimens (51 percent) were oaks, and 42 (26 percent) were pine. As in the early component samples, the remaining wood charcoal consisted primarily of hickory and ash. Five of the samples were from postholes (Features 60, 71, 72, 77, and 88), most associated with Structure 1 in Area V. As with the postholes from earlier components, these features appear to be filled with general site debris rather than the remains of construction material.

Results: Animal Bone from Late Component in Area VII

A total of 1636 vertebrate remains (453.4 g) make up the assemblage analyzed by Lucretia Kelly from the west half of Feature 97, a large pit in Area VII that has an AMS date with a calibrated median probability of A.D. 1503. The analyzed assemblage represents a sample (about 20 percent by weight) of the animal bone recovered from this pit. The results are discussed by animal class and feature zone to see if any differences can be observed as the pit was filled with refuse (Table 4). Remains from four of the five vertebrate classes are present (amphibians are not represented).

Some weathering, carnivore and rodent gnawing, and staining have taken place that indicate bones were exposed to the elements (Table 5). A portion of the assemblage has been burned. In some cases, only singeing is evident and that may reflect a cooking method such as roasting, where only a small part of exposed bone was directly subjected to fire. Bones that are blackened by fire are not usually exposed to high temperatures or are protected by soft tissue when exposed (David 1990). Calcined bone indicates exposure to higher temperatures or more prolonged exposure to fire. More blackened bone than calcined bone was recovered.

	338-71	338-72	338-75	338-76	338-78	338-79	Total NISP	Total MNI
	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Basal		
Mammals								
<i>Didelphis virginiana</i>		1					1	1
<i>Scalopus aquaticus</i>				1			1	1
<i>Neotoma floridana</i>		1	1				2	1
<i>Sciurus</i> sp.		3	3				6	1
cf. <i>Tamias striatus</i>		1		3			4	1
<i>Odocoileus virginianus</i>	7	13	18	5	13	5	61	3
large mammal			12	12	8		32	-
medium-large mammal	41	6	3	19	1	10	80	-
medium mammal		1	7	5			13	-
medium-small mammal		7		5			12	-
small mammal							0	-
Total mammal	48	33	44	50	22	15	212	8
Mammal or Bird		1		5			6	-
Birds								
<i>Meleagris gallopavo</i>				1			1	1
large bird				1			1	-
medium-large bird					1		1	-
medium-small bird		2					2	-
Total bird	0	2	0	2	1	0	5	1
Fish								
<i>Lepisosteus</i> sp.	1	3		1			5	-
<i>Lepisosteus osseus</i>				1			1	1
Catostomidae				1			1	-
<i>Moxostoma</i> sp.		1	1	7			9	1
Ictaluridae				1			1	1
<i>Esox</i> sp.			1				1	1
Centrarchidae	1	1	8	6		3	19	-
<i>Micropterus</i> sp.						1	1	1
<i>Lepomis</i> sp.			3	4			7	2
<i>Aplodinotus grunniens</i>	3		5	1		2	11	1
indeterminate fish	5	18	75	55		13	166	-
Total fish	10	23	93	77	0	19	222	8
Reptiles								
<i>Terrapene</i> sp.	1	2	1	3			7	-
<i>Terrapene</i> cf. <i>carolina</i>			1		1		2	1
<i>Chrysemys</i> complex		1	1				2	1
Testudines	16	34	14	42	3	3	112	-
Serpentes				2			2	-
Colubridae		3	1	1		1	6	1
Total Reptiles	17	40	18	48	4	4	131	3
Indeterminate Vertebrates	114	127	298	402	3	116	1060	-
Total Vertebrates	189	226	453	584	30	154	1636	20

Table 4. Summary of Fauna from 3MN298 Feature 97 (2014-338).

	Z2	Z3	Z4	Z5	Z6	Basal	Total	%NISP
Unburned	173	208	393	494	10	127	1405	85.9
Burned black	11	12	55	59	18	21	176	10.7
Calcined	5	6	5	31	2	6	55	3.4
Weathered	6	5	5	2	3	3	24	1.5
Gnawed	-	2	1	1	-	-	4	0.2
Cut Marks	1	1	-	3	1	1	7	0.4
Taphonomic Effects for Animal Classes:								
	Weight (g)	Unburned	Burned Black	Calcined	Weathered	Gnawed	Cut Marks	
Mammal	303.4	176	31	5	21	3	5	
Mammal/Bird	0.3	6	-	-	1	-	-	
Bird	38.1	4	1	-	-	1	1	
Fish	12.4	214	5	3	1	-	1	
Reptile	47.3	121	7	3	1	-	-	
Indeterminate vertebrate	51.9	884	132	44	N/A	N/A	N/A	
Total	453.4	1405	176	55	24	4	7	
N/A = Not available (weathering, gnawing, and cut marks were not recorded because of their very small size).								

Table 5. Feature 97 Taphonomy. Taphonomic Feature Effects by Feature Zone.

Mammals

The middle zones (3, 4, and 5) of pit Feature 97 yielded the most diverse taxa of mammals, with three to five taxa being identified. Deer (*Odocoileus virginianus*) is the largest and most likely the main economic mammal. The other taxa identified include small-medium sized mammals such as mole (*Scalopus aquaticus*), opossum (*Didelphis virginiana*), tree squirrel (*Sciurus* sp.), wood rat (*Neotoma floridana*), and possible chipmunk (cf. *Tamias striatus*). Tree squirrel and opossum could have been included in the diet, but it is likely that mole, wood rat, and possibly chipmunk are intrusions because they are burrowing animals. The other three zones contained only deer.

A total of 61 deer NISP was recovered from the feature, representing 3 MNI (Table 6). The deer specimens are scattered throughout the pit with zone 4 containing the largest number (n=18) and zone 5 and basal zone containing the fewest (five each). When viewing the deer remains as a single unit, a slightly lower percentage of extremity parts are present (56 percent) than what would be expected if an entire deer skeleton was present (67 percent). Axial elements are represented in a slightly higher percentage (32 percent as compared to 28 percent expected) and appendicular elements are present in almost three times the expected percentage (12 percent as compared with 5 percent expected).

A mandible with molars 2 and 3 was recovered from zone 3. The wear on the teeth was moderate to heavy indicating an individual about 4 ½-5 ½ years of age at death (Schwartz and Schwartz 1981; Severinghaus 1949). Five vertebral fragments (cervical) from zone 4 are very porous and are unfused. This individual was very young because vertebral centra fuse around two months of age (Purdue 1983). These fragments are only slightly larger than cervical vertebrae from a comparative skeleton of a full-term fetal deer. Since fawns are born in Arkansas between late March and late June (Sealander 1979:258), this deer was probably taken in the late spring or early summer months. There is an additional individual represented by a thoracic (zone 5) and a cervical vertebra (basal zone) with fused centra, but unfused centra epiphyses are present. These indicate an individual older than two months but younger than 2-3 years of age.

No bone tools are present. One antler tine tip was recovered from zone 3, but it could not be determined if it had been used as a tool such as a lithic flaker. Five deer specimens exhibit cut marks, most likely from butchering activity (Figure 12). Five deer specimens, all from zones 5 and 6, exhibit singeing that could be an indication of roasting meat. Non-human taphonomic processes include weathering (n=15) and rodent and carnivore gnawing (n=2). They were distributed throughout the pit rather than being concentrated in one or two zones.

	Standard	Z2	Z3	Z4	Z5	Z6	Basal	Total
Extremities								
Antler	2	5	1	-	-	-	-	6
Astragalus	2	-	-	-	-	-	-	-
Atlas	1	-	-	-	-	-	-	-
Axis	1	-	-	-	-	-	-	-
Calcaneum	2	-	-	-	-	-	-	-
Cuboid	2	-	-	-	-	-	-	-
Greater Cuneiform	2	-	-	-	-	-	-	-
Hyoid	2	-	-	-	-	-	-	-
Lateral maleolus	2	-	-	-	-	-	-	-
Lesser Cuneiform	2	-	-	-	-	-	-	-
Lunate	2	-	-	-	-	-	-	-
Magnum	2	-	-	-	-	-	-	-
Mandible	2	-	1	-	-	5	-	6
Metacarpal	2	-	-	-	-	-	-	-
Metacarpal, vestigial	4	-	-	-	-	-	-	-
Metatarsal	2	-	-	3	-	3	-	6
Patella	2	-	-	-	-	-	-	-
Phalanx 1	8	-	-	1	1	-	1	3
Phalanx 2	8	-	-	1	-	-	-	1
Phalanx 3	8	-	-	-	-	-	-	-
Phalanx, vestigial	24	-	-	-	-	-	-	-
Pisiform	2	-	-	-	-	-	-	-
Scaphoid	2	-	-	-	-	-	-	-
Skull	25	-	-	1	-	-	-	1
Tooth	32	1	2	1	1	-	-	5
Triquetral	2	-	-	-	-	-	-	-
Unciform	2	-	-	-	-	-	-	-
Total	147	6	4	7	2	8	1	28
%	67.10%							56.00%
Axial								
Innominate	2	-	-	-	-	-	1	1
Rib	26	-	5	4	-	1	1	11
Sacrum	1	-	-	-	-	-	-	-
Scapula	2	1	-	-	-	-	-	1
Sternebra	7	-	-	-	-	-	-	-
Vertebra, cervical	5	-	-	-	-	-	1	1
Vertebra, thoracic	13	-	-	-	2	-	-	2
Vertebra, lumbar	6	-	-	-	-	-	-	-
Total	62	1	5	4	2	1	3	16
%	28.30%							32.00%
Appendicular								
Humerus	2	-	1	-	-	-	-	1
Radius	2	-	1	-	-	1	-	2
Ulna	2	-	-	-	-	-	-	-
Femur	2	-	-	1	-	1	-	2
Tibia	2	-	-	-	1	-	-	1
Total	10	-	2	1	1	2	-	6
%	4.60%							12.00%
Total	219	7	11	12	5	11	4	50
Not used								
Metapodial	-	-	2	-	-	2	1	4
Sesamoid	-	-	-	1	-	-	-	1
Vertebra, unspecified	-	-	-	5	-	-	-	5
Total not used	-	-	2	6	-	2	1	11
Total Deer Remains		7	13	18	5	13	5	61

Table 6. Deer Elements from Feature 97, Site 3MN298.

Figure 12. Deer scapula from Feature 97, zone 2 (2014-338-71), with cut marks on glenoid from butchering, scale in cm (photograph by Katie Leslie).

Birds.

Only five bird NISP were recognized and only one taxon identified, turkey (*Meleagris gallopavo*). The one turkey specimen, a sternum, came from zone 5. It had light cut marks but also carnivore puncture marks.

Fish

Fish remains make up the largest number of NISP from the feature with 222, however 75 percent of the NISP could not be identified below the class level. Ten taxa were identified. These include longnose gar (*Lepisosteus osseus*), gar (*Lepisosteus* sp.), redhorse sucker (*Moxostoma* sp.), sucker family (Catostomidae), catfish family (Ictaluridae), pike (*Esox* sp.), sunfish family (Centrarchidae), bass (*Micropterus* sp.), sunfish (*Lepomis* sp.), and freshwater drum (*Aplodinotus grunniens*) (Figure 13). Centrarchids make up the largest percentage of the identified fish specimens (48.2 percent NISP) and 50 percent MNI. All but one of the taxa where MNI could be calculated had a MNI of one. Only *Lepomis* sp. had a MNI of two.

Most of the fish specimens are from small individuals. The longnose gar is of average size and is represented by a parasphenoid that has cut marks presumably made by dismembering the head from the body of the fish. The single bass specimen is weathered. The majority of the fish remains would likely not have been recovered without the use of flotation because the bones are so small.

Reptiles

Reptile remains, particularly turtle, were fairly numerous throughout the feature. Most of the turtle remains are small fragments of carapace or plastron that could not be identified further. Common box turtle (*Terrapene* cf. *carolina*) and box turtle (*Terrapene* sp.) were recovered from all zones but the lowest two (6 and basal). Two skeletal elements of a turtle in the *Chrysemys* complex of water turtles (which includes the

genera of *Chrysemys*, *Pseudemys*, *Graptemys*, and *Trachemys*; Ernst and Barbour 1989) were recovered from zones 3 and 4. None of the turtle specimens are from large individuals. Snake (Serpentes) remains (seven vertebrae and one rib) were recovered from four zones (3, 4, 5, and basal). Six of the eight vertebrae are from non-venomous snakes (Colubridae).

Figure 13. Freshwater drum pharyngeal from Feature 97, zone 5 (2014-338-76), scale in cm (photograph by Katie Leslie).

Discussion: Plant and Animal Foods at Dragover

Analysis of plant and animal remains from two pit features excavated at Dragover (3MN298) in the 1980s yielded a short list of taxa: plants included hickory and walnut shell, cane, grape seed, persimmon, and a wild seed from the bean family, but no cultigens; and animals included deer, turkey, fox squirrel, box turtle, snapping turtle, bullfrog, longnose gar, bowfin, channel catfish, shiners, chubs, topminnows, water snake, and freshwater mussels (Bennett et al. 1986:60-67). Our more extensive analyses of features excavated in 2013-2014 from the site has added plant and animal taxa to these lists, most importantly documenting cultivated plants. Squash now dated to the ninth century A.D. is the earliest cultigen present. Corn, squash, a bean, and a domesticated chenopodium seed came from features dating between the fifteenth and seventeenth centuries A.D.

Samples from the late component (Caddo period) contain nearly all the plant taxa of the features from the earlier components. In addition, the later samples produced remains of three crop plants and numerous small seeds. There is also an increase in non-wood plant density between the earlier and later component features (Figure 14). Cooking fires would have been necessary throughout the occupation

sequence. The increased density of non-wood plants may reflect an actual increase in plant food use, but better preservation in the more recent deposits or the destruction or dispersion of earlier plant material by later occupations may have contributed to the apparent increase.

The taxa composition of the wood and nutshell in the samples from earlier and later component features are generally similar. Wood charcoal recovered to date is interpreted as fuel wood. In this context, the similarity between earlier and later components suggests a continuity in the composition of the local forest composition from Late Archaic through Caddo periods.

Figure 14. Comparison of plant densities between early and late components at Dragover (wood charcoal and nutshell density per cubic decimeter of processed fill by weight).

The relatively large number of animal remains recovered from Feature 97 is in part attributed to good preservation and to the use of flotation, but this was the only feature excavated with significant amounts of preserved faunal material. While 35 percent of the 1636 vertebrate NISP could be identified to animal class (Figure 15), only 9 percent could be identified to a taxonomic level of family, genus, or species. Mammals were identified most frequently, with deer remains present in the greatest number and at least three individuals present. The other mammals are small-medium in size and represented by only one individual each. Fish are frequent in the assemblage but most are small individuals and would not have made a great contribution to the diet. The same can be said of the turtles. Turkey is the only bird present and is represented by a single specimen.

The ancestral Caddos utilized the environments close to the site including the Ouachita River and the adjacent wooded areas. The young deer in Feature 97 was probably taken in the late spring or early summer months. The fish and turtles would also indicate exploitation in warmer months of the year. Because of their small size it is likely they would have been captured by net or basket. Weathering and animal gnawing on some of the bones indicates they may have lay exposed on the surface for a time before being deposited into the pit as refuse. Some bones were burned, so this may have included cleaned-out fire pits. The types of animals represented are most likely from general domestic activity rather than a specialized activity such as feasting.

Figure 15. Summary of animal classes identified in Feature 97, 3MN298 (NISP percentages for identified vertebrates).

Regional Comparisons

The spectrum of plants recovered at the Dragover site is typical for the time periods represented, with wood charcoal and nutshell dominating the early components, and crops – especially corn – and small seeds present in the later samples. Dimensions of the corn cupules recovered to date from the site fall into the small end of the range of archeological Caddo corn (Table 7). It is worth remembering that 53 of the 89 cupules measured at the site come from the tip end of a single cob. Cupules and associated kernels at the tip (distal) end of corn cobs are typically smaller than those of the mid-shaft, and this is one possible explanation for the small mean cupule dimensions. Another possibility is that corn from Dragover was a smaller variety than that grown for consumption at other Caddo sites.

Late prehistoric corn assemblages are compared in Table 8 according to the number of rows of kernels present on cobs at the site. With only one cob of 12 rows available from Dragover, comparison to other assemblages is limited to the observation that 12-rowed corn is typical on Mississippian and Caddo sites. Seven cob fragments from Winding Stair on the upper Little Missouri River in the Ouachita Mountains consisted of three 12-row and four eight-row specimens (Williams 2000). Both cob fragments recovered from the Ramos Creek site in southeastern Oklahoma were from 12-row corn (Dowd and Regnier 2014). Fort Ancient sites more typically have higher percentages of eight-rowed corn. Although different varieties of corn often have different ranges of row numbers, row number varies within corn varieties, and more than one variety can have the same typical range.

Historical accounts offer more detailed information on historical varieties of Caddo corn. One of the earliest accounts of corn in the Caddo area comes from Casañas, writing to the Viceroy of Mexico in 1691:

Among the seeds which the Indians plant in the proper season, is corn of two kinds, which they plant in abundance. One kind matures in a month and a half and the other in three months. (Hatcher 1927c:211)

Site	Cupule mean width (mm)	Cupule mean thickness (height) (mm)	Number of cupules measured	Reference
Dragover (3MN298) loose cupules (Fea. 11, 38, 97)	4.3	1.8	36	this article
Dragover (3MN298) Fea. 97 cob fragment	4.3	2.7	53	this article
Oak Hill Village (41RK214) Fea. 86*	4.8	3.1	~10,220	Elson et al. 2004
Musgano (41RK19)	4.8	2.2	1380	Bush 2014a
41PN175 Fea. 87	4.8	2.3	39	Bush 2015
W. A. Ford (41TT852)	5	2.9	10	Bush 2014b
Shelby Mound (41CP71)	5	2.8	52	Bush 2014c
Pine Tree Mound (41HS15)	5.3	2.3	106	Bush 2012
Stallings Ranch (41LR297)	5.4	3.1	35	Bush 2008
41CP183	5.4	2.1	24	Sherman et al. 2015
Eli Moores (41BW2) Cob #1	5.8	3.5	21	Perttula (ed.) 2014
Henry M. (41NA60) Lot 292	6.1	1.9	20	Perttula et al. 2010
Ramos Creek (34MC1030), all others	6.4	3.1	87	Dowd and Regnier 2014
Winding Stair (3MN496)	6.5	n/a	256	Williams 2000
Eli Moores (41BW2) loose cupules	7.1	3.4	60	Perttula (ed.) 2014
Indian Creek 2 (41SM404) Fea. 1	7.1	3.4	8	Nash 2012
Sha'chahdinnih (41MR211)**	7.2	2.8	229	Goldborer 2002
Ramos Creek (34MC1030) Lot 448.3	8.4	3.3	5	Dowd and Regnier 2014
*Mean of measurements given in Table 91. Number of cupules estimated from 108 measurable cobs, row numbers distributed as given in Table 91, assuming 10 measurable cupules per rank.				
**Mean of measurements given in Appendix Tables 3A, 3B, 3C and 3D				

Table 7. Corn cupule (*Zea mays*) measurements from selected Caddo sites.

Site	Row numbers, by percentage of cobs present						Site Type	Reference
	8	10	12	14	16	N		
Moundville (1TU500), I	21%	42%	13%	17%	8%	24	Mississippian	Scarry 1986:Table 9.1
Moundville (1TU500), II/III	29%	50%	20%	1%		119	Mississippian	Scarry 1986:Table 9.2
Angel (12Vg1)	35%	42%	22%	1%		367	Mississippian	Wagner 1991:Table 1
George C. Davis (41CE19)	36%	46%	18%			325	Caddo	Jones 2000:249
Oak Hill Village (41RK214)	39%	41%	17%	3%		109	Caddo	Elson et al. 2004
Pine Tree Mound (41HS15)	43%	29%	29%			7	Caddo	Bush 2012
Winding Stair (3MN496)	57%		43%			7	Caddo	Williams 2000
Ramos Creek (34MC1030)			100%			2	Caddo	Dowd and Regnier 2014
Dragover (3MN298) Fea. 97			100%			1	Caddo	this article
Sha'chahdinnih (41MR211)		100%				7	Caddo	Goldborer 2002:Appendix Table 2
Roseberry (46MS53a)	94%	5%				902	Fort Ancient	Wagner 1987:Table 6.3
Incinerator (33MY57)	77%	10%	7%	1%		88	Fort Ancient	Wagner 1987:Table 6.3
Canter's Caves (33JA3)	69%	17%	11%	2%		84	Fort Ancient	Wagner 1987:Table 6.3
Kettle Hill Cave (33FA2)	78%	18%	4%			77	Fort Ancient	Wagner 1987:Table 6.3

Table 8. Corn Cob assemblages at selected Late Prehistoric Agricultural Sites in the Eastern US.

Antoine-Simon Le Page du Pratz lived among Native people in Louisiana and Mississippi in the early eighteenth century, learning the Natchez language. Although not Caddoan speakers, the Natchez are Mississippian descendants who probably had similar corn traditions. Le Page du Pratz (1774:Book III, Chapter I) describes six types of corn that ripened at different times and had kernels of varying colors and sizes.

Squash was the only pre-maize crop recovered from Dragover, and it is among the earliest domesticates in the Americas (Kistler et al. 2015). The single domestic-type specimen of chenopodium was recovered from Feature 88 in a Caddo context. As discussed above, the chenopodium specimens from Feature 97 appear to be thick-testaed, the wild type of *C. simplex* or *C. berlandieri* var. *bushmanum*. Similarly, the *Polygonum* specimen is lenticular in shape and clearly not the trigonous *Polygonum erectum* that was domesticated in some areas.

Cultivation of native starchy seeds of chenopodium, maygrass, little barley, and knotweed contemporary with Fourche Maline occupations is known elsewhere in the Central Mississippi and Ohio River valleys, roughly in the areas of the later Mississippian and Fort Ancient cultures (Johannessen 1993:Figure 5-1). Starchy seed cultivation was either absent or less important in other areas of the Eastern Woodlands. In the Lower Mississippi River valley, there is little evidence of native starchy seed use until Marksville times, but even then cultivation is “not on the scale of their trading partners to the north” (Fritz 2000:238). Only in the northern part of the Lower Mississippi River valley does pre-corn cultivation seem to have been important, as at the Taylor Mounds site in southeastern Arkansas (Fritz 2000:238). In contrast to the situation in the Lower Mississippi River valley, intensive cultivation of native seed crops is apparent in the Arkansas River valley (Fritz 2000:238). Although the investigators could not be sure the seeds were cultivated, all four types of native starchy seeds were recovered from the Hardman site, which lies farther down the Ouachita River in the Coastal Plain (Fritz 1993). In the Ouachita Mountains, the Winding Stair site in the upper Little Missouri River valley produced chenopodium and possible knotweed. Only chenopodium is present at Amos, in the upper Caddo River valley (Williams 2000). The dearth of these starchy seeds at Dragover is consistent with previous findings in the Ouachita Mountains.

Few Caddo sites from the Ouachita Mountains region have faunal remains preserved and reported (Dellinger and Dickinson 1941; Early 1988:140-142), so a regional comparison is not yet possible. A few Caddo sites along the Ouachita River to the south can be compared as well as a Woodland site in the Ouachita Mountains to the north. The Wild Violet site, located in Logan County on a tributary of the Petit Jean River, had a large but highly fragmented faunal assemblage recovered from the Woodland occupation (Kelly 2015). While there may be some bias in what taxa were identified because of taphonomic issues, the inhabitants of the Wild Violet site focused much of their exploitation of fauna from terrestrial habitats and on deer in particular. There was some utilization of the adjacent aquatic habitats as evinced by a few fish vertebra, aquatic turtles (soft-shell and *Chrysemys*), beaver, and freshwater mussel. In general, the few upland Woodland sites in Arkansas that have had faunal analyses conducted (Kelly 2011a; Styles et al. 1985; see also Jackson and Scott 2002) appear to be very similar in composition. Most of the remains are recovered from midden contexts, and are impacted by taphonomic processes of weathering, animal gnawing, burning, and fragmentation. Terrestrial habitats were exploited most frequently with deer and box turtles the primary taxa taken. They have a variety of small to medium-sized mammals present, but in relatively low numbers. Turkey was the primary bird exploited. Aquatic habitats were exploited to a lesser extent with the presence of a few aquatic turtles and mammals, fish, and freshwater mussels. It is possible the more fragile fish remains have been removed from the assemblages through taphonomic agents.

Turning to more contemporary Caddo sites in the Ouachita River drainage, only a few have had faunal materials preserved and analyzed. The Caddo inhabitants at the Jones Mill site, located to the east of Dragover, exploited nearby edge and aquatic habitats, the latter most likely being the Ouachita River (Trubitt et al. 2011). The assemblage recovered was very similar to Dragover where deer provided the greatest amount of meat, but fish, turtles, and possibly mussels would have also been important sources of animal protein. Birds do not appear to have been exploited to a great extent with turkey the only species identified. In the Gulf Coastal Plain south of the Ouachita Mountains, the Hardman site near the middle Ouachita River had faunal material recovered from Mid-Ouachita to Deceiper phase occupations (ca. A.D. 1450-1700; Styles and White

1993). The site inhabitants focused their faunal exploitation on deer and fish supplemented by freshwater mussels, aquatic turtles, and a variety of small and medium-sized mammals and terrestrial birds. There was an increase in aquatic taxa between the Mid-Ouachita and Deceiper phase occupations at Hardman. More taxa are found at Hardman than at Dragover, but the taxa are similar in composition between the two sites.

At the Hughes site, further south and east in the Gulf Coastal Plain near the Saline River in central Arkansas, deer and tree squirrels were the most utilized mammals (Kelly 2011b). Birds and fish remains were not prevalent in any of the units while turtle remains made up a slightly larger proportion. Turkey and passenger pigeon were the most utilized birds, and box turtles the most utilized turtle. Three-ridge and Wabash pigtoe were the most prevalent mussels.

Weinand and colleagues (1997) compared fauna from early and late Caddo sites. Their comparison (see Weinand et al. 1997:Table 17) suggests that if a site is located along a larger creek or bayou, more of the vertebrate remains come from aquatic animals or those that inhabit bottomlands (other than deer), but if a site is further from a larger stream, more remains come from deer. They conclude that location with proximity to water plays a greater role in what animals are exploited than whether a site dates to the early or late Caddo period. The fauna from the Hughes site, however, does not fit this hypothesis. The Hughes site is in a bottomland setting of the Saline River. One explanation for this difference is that the Hughes faunal assemblage comes from near the base of a mound and may represent food refuse from mound activity such as feasting or from higher status individuals (Kelly 2011b). Faunal remains from more contexts at Hughes are needed to confirm whether this small assemblage represents specialized activity. Fauna from domestic contexts at Hughes would also help determine if the exploitation pattern of the occupants was different from other Caddo sites located in bottomlands of larger streams and rivers.

The few Caddo sites with analyzed faunal assemblages in the middle to upper Ouachita drainage overall have similar assemblages. Deer is the primary mammal utilized with some small to medium-sized mammals also taken. Birds as an animal class are not well represented but turkey is usually present. If the site is near the river, fish, turtles, and freshwater mussels are well utilized, however, the amount of meat they would have provided would not have been great. The amount of aquatic species in the assemblages appears to increase from the Woodland period. However, it is possible that this may be more a function of taphonomy rather than utilization.

Conclusions

Analyses of plant and animal remains from excavations at the Dragover site (3MN298) provide new information on the foodways of the people who inhabited the Ouachita Mountains in the past. The dominant food represented in the earlier Archaic and Woodland (Fourche Maline) components is nuts, primarily thick-shelled hickory, but greenbrier was also present, as well as squash, the earliest cultigen recovered at the site. The lack of preserved bone or shell in the early components means there is a lack of evidence on Archaic and Woodland period animal use. Changes are documented in the use of plants for food through time, especially as ancestral Caddo Indians incorporated domesticated crops – corn, squash, beans, and chenopodium or goosefoot – into their diet. Wild plants continue in importance, with several kinds of nuts, wild fruits (strawberry, maypop, grape, hawthorn, and persimmon), and wild greens and grains (purslane, chenopodium) present. In the late component, the people exploited both terrestrial and aquatic resources for food animals, using deer, squirrel, opossum, turkey, several kinds of fish, turtle, bullfrog, snake (perhaps eaten), and freshwater mussel. Many of these foods are still important to contemporary Caddos (Attocknie 2015).

Further analysis will include comparisons of different excavation areas and clarification of community patterns at Dragover and their changes through time. The differential preservation of animal bone across the site is an issue for continued investigation, and the early presence of cultivated squash as well as both wild and domesticated chenopodium in the Caddo component can be pursued further. There are additional samples that can be analyzed once additional funding is secured. Nevertheless, these preliminary results show the research potential of this site and add much needed detail to our picture of Caddo and pre-Caddo lifeways in the Ouachita Mountains region.

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