

APPENDIX F:
ARCHAEOBOTANICAL ANALYSES

RESULTS OF ARCHAEOBOTANICAL ANALYSIS

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Introduction

Ten soil samples retained from 10 discrete prehistoric cultural features encountered at the Black Diamond Site (7NC-J-225) were submitted for flotation processing and macro-botanical analysis (Table E-1). Three general feature types were sampled for plant macro-remains. These included a variety of basin feature sub-types, post features and features of indeterminate morphology.

Table F-1. List of Soil Samples Analyzed.

Provenience	Locus	Horizon	Bag No.	Comments
N245 E412	Feature 9	I3	5004	Large Basin with posts
N248 E414	Feature 11	I1	5020	Large Post/conical pit
N253 E421	Feature 29	I2	5023	Large irregular basin
N245 E410	Feature 46	I2	5003	Large basin
N236 E412	Feature 69	I2	5042	Large basin
N238 E407	Feature 60	L3	5030	Cylindrical basin
N237 E411	Feature 71	I2	5052	FCR-filled basin
N244 E412	Feature 24	I1	5058	FCR-filled basin
N241 E410	Feature 67	I1	5031	Feature originated below plow zone
N248 E414	Feature 19	I1	5017	Possible prehistoric post

Methods

Where possible, standard 2-liter soil samples were routinely collected during feature excavation. The small size of Feature 19 prohibited collection of the standard volume, and only 200 grams of cultural sediment were submitted. From stratified features, soil samples were obtained from unscreened fill secured from across the base of stratigraphic levels. Soil samples were thoroughly dried, then packed for storage in vinyl bags.

Plant macro-remains were isolated from the feature soils using water flotation. Samples were individually processed using a Flote-Tech machine-assisted flotation system equipped with 0.325mm fine fraction and 1.0mm coarse fraction screens. The Flote-Tech system is a multi-modal flotation system which facilitates the separation and recovery of plant remains from the soil matrix via agitation in water combined with variable aeration delivered through submerged pipes. Processing resulted in two size fractions (heavy and light). Resulting floated portions were air dried.

Each processed sample was passed through geologic sieves to separate size fractions of recovered plant remains. The greater-than-or-equal-to 2 millimeter fraction was examined with a binocular microscope under low magnification (10X to 40X) and sorted into broad categories of material. Non-botanical remains were separated as an aggregate and not further categorized. Carbonized plant remains and non-carbonized seeds were sorted into taxonomic categories (wood, seed, amorphous carbon, et cetera). The less than 2 millimeter fraction was examined under low magnification and

the remains of seeds were removed for analysis. Each category of vegetative material was quantified by weight and fragment count.

Identifications were attempted on all seed, wood and miscellaneous plant materials recovered. Identifications of all classes of botanical remains were made to the genus level when possible, to the family level when limited diagnostic morphology was available, and to the species level only when the assignment could be made with absolute certainty. When botanical specimens were found to be in such eroded or fragmentary condition that complete examination or classification was impossible, a variety of general categories were used to reflect the degree identification possible: General wood categories within the analyzed assemblage include '*deciduous taxa*', where specimens could be identified as having a porous vessel arrangement reflecting deciduous trees rather than a trachid arrangement indicative of coniferous taxa; and '*unidentifiable*', where specimens were so fragmentary or minute that no clear section could be obtained upon which to base identification. The category '*amorphous carbon*' was used to classify carbonized remains which lacked any identifiable characteristics whatsoever.

Specimen identifications were made under low magnification (10X to 30X) with the aide of standard texts (Martin and Barkely 1961; Panshin and deZeeuw 1980; USDA 1956; Hoadley 1990), and checked against plant specimens from a modern reference collection representative of the flora of New Castle County, Delaware. Specimens were weighed using an electronic balance accurate to 0.01 grams.

Results of Analysis

Flotation processing of 18 liters plus 200 grams of feature soil from the Black Diamond Site (7NC-J-225) yielded 0.07 grams of charcoal, or an average density of approximately 0.05 grams of charcoal per liter of feature fill. Sample matrices were consistently composed of medium - grade quartzitic gravel. Fresh rootlets were abundant in all processed samples, and insect egg cases and body fragments were ubiquitous. Lithic debitage and woody root remains were also observed. Recovered plant remains include deciduous and unidentifiable wood, non-carbonized seeds, and unidentifiable amorphous charcoal. Table E-2 presents an inventory of flotation-recovered plant remains from the Black Diamond Site.

Wood charcoal was present in 50 per cent of the samples analyzed, and comprised 86 per cent of the site macro-botanical remains (by weight). A total of 10 carbonized wood fragments weighing 0.06 grams was recovered. Wood remains recovered from the Black Diamond Site were minute and fragmentary, and detailed taxonomic classification was not possible. Seven fragments were identified as being deciduous, and the remaining 3 fragments were unidentifiable.

Non-carbonized seeds were encountered within 8 of the 10 samples analyzed. Three-seeded mercury (*Acalypha sp.*), carpetweed (*Mollugo verticillata*), raspberry or blackberry (*Rubus sp.*), and members of the nightshade (*SOLANACEAE*) and knotweed families (*POLYGONACEAE*) seeds were identified. These plant species are common to disturbed environments such as agricultural and forest edge settings.

Miscellaneous plant-related materials were limited to a single fragment of amorphous carbon recovered from the Feature 46 sample.

Table E-2. Inventory of flotation-recovered plant remains from 7NC-J-225.

Soil Sample Number	5004	5020	5017	5058	5023	5030
Provenience	N245 E412-413	N248 E414-415	N248 E414	N294 E412	N253 E421	N238 E407
Feature	9	11	19	24	29	60 w1/2
Strata	1	1	1	1	1	1
Level	3	1	1	1	2	3
Soil Sample Volume (liters)	2	2	200 grams	2	2	2
Total Charcoal Weight (grams)	0.02	<0.01	0.01	0.02	0.01	0
WOOD CHARCOAL (total count)						
	4	1	1	3	1	0
total weight (grams)	0.02	<0.01	0.01	0.02	0.01	0
deciduous taxa	4			3		
unidentifiable		1	1		1	
total fragments identified	4	1	1	3	1	
NON-CARBONIZED SEED REMAINS (total count)						
	5	1	1	10	0	1
<i>Acalypha sp. (three-seeded mercury)</i>	2	1	1	2		1
<i>Mollugo verticillata (carpetweed)</i>	2					
<i>Rubus sp. (raspberry/blackberry)</i>				1		
SOLANACEAE	1					
POLYGONACEAE (knotweed family)				7		
unidentifiable						
OTHER PLANT REMAINS (total count)						
	0	0	0	0	0	0
total weight (grams)	0	0	0	0	0	0
amorphous carbon						

Table E-2. Inventory of flotation-recovered plant remains from 7NC-J-225 (Continued).

Soil Sample Number	5003	5031	5042	5052	TOTALS
Provenience	N245 E410	N241 E410-411	N236 E412	M237 E411	10 samples
Feature	46	67 e1/2	69	71	
Strata	1	1	1	1	
Level	2	1	2	2	
Soil Sample Volume (liters)	2	2	2	2	18 l. plus 200 g.
Total Charcoal Weight (grams)	0.01	0	0	<0.01	0.07
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WOOD CHARCOAL (total count)	0	0	0	0	10
total weight (grams)	0	0	0	0	0.06
deciduous taxa					7
unidentifiable					3
total fragments identified					10
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NON-CARBONIZED SEED REMAINS (total count)	4	0	2	5	29
<i>Acalypha sp. (three-seeded mercury)</i>	2		1	5	15
<i>Mollugo verticillata (carpetweed)</i>			1		3
<i>Rubus sp. (raspberry/blackberry)</i>					1
SOLANACEAE					1
POLYGONACEAE (<i>knotweed family</i>)	1				8
unidentifiable	1				1
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OTHER PLANT REMAINS (total count)	1	0	0	0	1
total weight (grams)	0.01	0	0	0	0.01
amorphous carbon	1				1

Summary and Recommendations

The processing of over 18 liters of cultural fill from 10 features at the Black Diamond Site yielded extremely scant macro-botanical data. While a variety of cultural features were analyzed, archeobotanical remains were uniformly nearly-absent across the site. The presence of non-carbonized, non-native seeds within archaeological contexts indicates some level of disturbance of cultural deposits at Black Diamond. Generally, the presence of non-carbonized seed remains within prehistoric flotation samples from open-site environments is usually considered evidence of modern seed contamination (Minnis 1981; Keepax 1977; Smith 1985). Non-carbonized seeds are a common constituent of archeobotanical assemblages from prehistoric sites across the coastal plain of Delaware (Custer, Watson and Silber 1996; Custer, Riley and Mellin 1996; LeeDecker et al. 1998; Versar 2011; Petraglia et al. 2002) and these data from the Black Diamond Site concur with the regional pattern.

While wood charcoal was present in half of the analyzed samples, the fragments were largely unidentifiable, prohibiting interpretation of fuel selection and local landscape conditions. The paucity of food plant remains (nuts and seeds are commonly preserved archaeologically), also prevents further exploration of subsistence issues, seasonality, or plant food processing technologies which are of particular interest to research of Woodland I prehistory in Delaware.

Based on these data, ethnobotany at the Black Diamond Site remains obscure. However, the scarcity of archeobotanical remains at the Black Diamond Site is probably the result of preservational conditions rather than a measure of the importance of plant resources to site residents.

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