

Jamestown 1611 Well Archaeobotanical Analysis
Report Prepared for Historic Jamestowne
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Three bulk soil samples from an early well feature at Jamestown were submitted for analysis, along with an array of screen-recovered macrobotanical materials for identification. The deposits were waterlogged and presumed to have high potential for organic preservation.

Methods

One-liter bulk samples were measured for contexts, JR2158Z and JR2158AA while a 500 ml volume was used for context JR2158AB. Contexts “Z” and “AA” were increased from the 500 ml sample volume (called for in the research design) to increase recovery potential. The volume was increased in the case of “Z”, because it was interpreted as primary waterlogged context, and “AA” because the presence of large wood fragments was thought to impart a volumetric bias against smaller seed remains in the deposit. Water flotation, the most common method for botanical recovery on archaeological sites, is not appropriate for waterlogged samples as the materials will not float when saturated, necessitating smaller-volume samples (Pearsall, 2000).

Samples were separated from sediment with water using nested geological sieves of 4mm, 2mm, 1mm, 500 μ and 250 μ aperture sizes. Material smaller than 250 μ was not retained. Size fractions for each sample were individually examined under a low-power dissecting microscope at 10x-30x magnification. 500 μ and greater size fractions were completely sorted; due to volume and time constraints, the 250 μ size fractions (generally smaller than most seeds) were scanned, approximately 50% of each 250 μ fraction was examined. Whole or nearly complete seeds and other identifiable botanical macroremains were sorted and identified using standard references (e.g., Fernald 1950, Martin, 1946, Martin and Barkley, 1961, , Montgomery 1977, Young and Young 1992), as well as the Colonial Williamsburg archaeobotanical laboratory’s comparative collection. Screen-recovered botanicals were submitted already separated in individual bags, and were identified using the same reference keys and comparative material. Specimens were generally identified conservatively to the genus level in the absence of overwhelming morphological or species-distribution data to indicate otherwise. Nevertheless, usually only a small number of individual species are probable candidates for each specimen. Likely but tentative designations are preceded by “cf.”.

Results

The identified taxa in the well samples are overwhelmingly local and New World in origin, with virtually no European-introduced species present, with the possible exception of a single *Portulaca* (purslane) seed identified in level 2158AA (*Portulaca* species are indigenous to both the Old and New Worlds, although the most common

species, *Portulaca oleracea* is European). Conversely, however, the assemblage is strongly biased toward economically important taxa; the impression of the samples is not simple “environmental” detritus inadvertently caught in the well, but a true cultural assemblage.

Cultigens

A maize cob (2158AA B51), squash fragments, a single common bean, and tobacco seeds were all recovered from the assemblage. No maize kernels were encountered, and the single Cucurbit seed, curiously, is morphologically more similar to the inedible bottle gourd (*Lagenaria siceraria*), used primarily for container-production by many groups (including the indigenous Powhatan) than the edible pumpkin/squash *Cucurbita pepo*. All of the rind fragments in the well, however, were *C. pepo*-like, indicating both species were probably in use. The presence of tobacco seed is intriguing, as they are rarely encountered in archaeological assemblages for a variety of reasons (cultural practices of “topping” tobacco plants, small size, and recovery biases). Two of the recovered seeds were in very poor condition and therefore only tentatively identified as tobacco. One unanswered question regarding tobacco use at Jamestown at this early date is whether native *Nicotiana rustica* tobacco is represented, or the re-imported West Indian commercial *N. tabacum*. Unfortunately, however, both species’ seeds are too similar to distinguish on the basis of morphology alone (Roberts, 1995). No common European cultigens at all were present in the samples.

Wild Economic Taxa

As intriguing as the presence of major cultigens is the strong indication of exploitation of locally available wild or “managed” plant resources as foods. By far the most common taxa in the bulk samples was *Vaccinium* sp., or blueberry. Other wild edibles include *Diospyros virginiana* (persimmon), *Rubus* (blackberry), *Passiflora incarnata* (maypop/passion fruit), *Vitis* sp. (grape), and two separate types of *Prunus* sp. (wild cherry and chickasaw plum). One likely tuber fragment (JR2158AB B31), and many *Scirpus* (bulrush) seeds hint at the possibility of exploiting these wetland plants not only for thatching and fibers but possibly for their edible tubers as well. The mast species (predominantly *Carya* [hickory] and *Juglans* [walnut], but also *Fagus* [beech] and *Quercus* [oak/acorn]) less clearly represent food resources. Most specimens were found in the screen material whole or nearly whole with only a few nutshell fragments indicating deliberate hulling of the nuts. Nutshell was rare in the bulk samples.

Formation Process and Environmental Indicators

Comparing the three bulk samples stratigraphically does not reveal obvious distinctions. Curiously, JR2158Z, presumably more dense culturally in other aspects, was not as dense botanically as the two lower levels transitioning out of the feature to subsoil (Density calculations can be standardized to one liter by doubling the counts for JR2158AB).

There are some indicators of seasonality in the samples. Overall, in the absence of any other evidence suggesting the deposit remained open for an extended period, the assemblage seems to indicate a late-summer pattern, especially the uncharred *Vaccinium* seeds. Blueberries tend to ripen in late July and August. *Vitis* (grape) tends to be slightly later; these seeds were only identified from JR2158AB. A late-summer season of deposition may also be an explanatory factor for the unhulled hickory and walnut nuts; they may have been deposited before ripening. One possible *Fagus* (beech) – like leaf fragment (JR2158AA, B65) retained a green color, also consistent with a pre-autumnal season.

A few recovered non-economic taxa (*Asteraceae* family, *Xanthium strumarium*, *Silene* sp.) are favorably adapted toward disturbed ground habitats such as cleared land, such as human settlements or agricultural fields. The presence of several pellets of herbivore dung among the screen botanical samples also hints at the potential for understanding livestock management, grazing and feeding practices. These clearing indicators, however, are in the minority within the overall assemblage, which appears predominantly woodland (the arboreal species) with a significant wetland component, notably *Scirpus* as well as *Nyssa*. This, of course, is consistent with the multiple environmental zones of Jamestown Island (Loetterle, 1970, Mrozowski, 2001a). Mrozowski's botanical analysis of Refuse Pit 1 in New Towne (Mrozowski, 2001b) shows a stronger influence of Old World taxa (particularly weedy species) than is seen in this assemblage. The samples would seem to be too homogeneous to estimate any broad-scale environmental change.

Conclusions/Further Research

The three processed bulk samples in conjunction with the screen-recovered botanicals suggest that early Jamestown was strongly experimenting primarily with local plant resources rather than relying on imported European species for horticulture or other ethnobotanical practices. Old World taxa are surprising in their absence amid a largely economic plant assemblage.

Great potential exists for further archaeobotanical research on these and other samples. Methodological experimentation (such as using chemical flotation) may be warranted on further waterlogged samples to increase recovery efficiency and shorten the analysis time which currently prohibits working with larger volume samples. Additionally, within the bulk samples, wood species identification may reveal additional information about the forest composition in the early years of the Jamestown settlement. While wood identification was outside the scope of work of this study, a cursory examination of the numerous wood fragments in JR2158AA revealed them to be largely heterogeneous, a mixture of hard and softwoods (i.e., not the result of a single constructed feature such as a well lining). Additionally, the very rare finds of the early *Nicotiana* seeds, in particular the uncharred specimen have strong potential for answering questions about the timing of the transition from *N. rustica* to *N. tabacum*. Further scanning of these samples for additional tobacco seeds would be well worthwhile if a DNA analysis is deemed feasible for differentiating the two species. As a waterlogged context, the well samples were of course unique in preserving much uncharred material that normally does not survive average archaeological burial conditions. While these

fortuitous circumstances are rare opportunities, focusing solely on these types of deposits eventually becomes interpretively limiting due to a lack of comparative contexts for study. Further systematic study of more common non-waterlogged contexts is recommended, both to evaluate intra-site variability, but also as a gauge of overall preservation conditions and formation processes on site. Understanding both environmental change and the material culture aspects of plant stuffs is one of the most poorly understood aspects of early colonial archaeology in Virginia and elsewhere.

Identification Data

Bulk Sample Data:

JR2158Z

Family	Genus	Species	Common Name	Count/Note
Cornaceae	<i>cf. Nyssa</i>		Black gum	1
Rosaceae	<i>Rubus</i>	sp.	Blackberry/bramble	1
Solanaceae	<i>Nicotiana</i>	sp.	Tobacco	2 (1 tentative ID, charred)
Cyperaceae	<i>Scirpus</i>	sp.	Bulrush	6
Portulacaceae	<i>Portulaca</i>	sp.	Purslane	1
Ericaceae	<i>Vaccinium</i>	sp.	Blueberry	2
cf. Cucurbitaceae	<i>Lagenaria</i> or <i>Cucurbita</i>	sp.	Gourd/squash	1 (stem fragment)
Caryophyllaceae	<i>cf. Silene</i>	sp.	Catchfly	

JR2158AA

Family	Genus	Species	Common Name	Count/Note
Apiaceae	family			1 (schizocarp)
Aquifoliaceae	<i>Ilex</i>	<i>opaca</i>	American holly	1
Asteraceae	family			1 cf. <i>Chicorium</i> , <i>Cirsium</i> spp. (Chicory or Thistle)
cf. Cucurbitaceae	<i>Lagenaria</i> or <i>Cucurbita</i>			Stem fragment
Cyperaceae	<i>Scirpus</i>	sp.	Sedge	16
Ericaceae	<i>Vaccinium</i>	sp.	Blueberry	48
Juglandaceae	<i>Carya</i>	sp.	Hickory	1 (nut fragment)
Unidentified				1 bud or fruit; 2 seed fragments; misc fragments

JR215AB

Family	Genus	Species	Common Name	Count
Rosaceae	<i>Rubus</i>	sp.	Blackberry/bramble	1
Asteraceae	<i>Bidens</i>	sp.	Beggar's tick/sticktight	1
Ericaceae	<i>Vaccinium</i>	sp.	Blueberry	14
Solanaceae	<i>cf. Nicotiana</i>	sp.	Tobacco	1
Plantanaceae	<i>Platanus</i>	<i>occidentalis</i>	American sycamore	2
Cyperaceae	<i>Scirpus</i>	sp.	Bulrush	2
Polygonaceae	<i>Polygonum</i>	sp.	Smartweed/Knotweed	2
Unidentified				2 buds

Screen-Recovered Botanicals

JR 2158 X

Number	Family	Genus	Species	Common name	Part	Note
B012	Juglandaceae	Juglans	nigra	Walnut	Nut, fragment	1

JR 2158Z

Number	Family	Genus	Species	Common name	Part	Note
B041		Insect/Arthropod - not botanical			egg or pupa case?	
B042	Aquifoliaceae	Ilex	opaca	American holly	seed	1
B043	Rosaceae	Prunus	cf. angustifolia	Chickasaw plum	stone	1

JR 2158AA

Number	Family	Genus	Species	Common name	Part	Note
B001	Juglandaceae	Juglans	nigra	Black walnut	Nut	Two, whole - husk removed
B003	Juglandaceae	Carya	sp.	Hickory	Husk	two fragments
B004	Juglandaceae	Carya	sp.	Hickory	nut	1, whole
B005	Juglandaceae	Carya	sp.	Hickory	nut	2
B006	Juglandaceae	Carya	sp.	Hickory	Nut	1
B007	Juglandaceae	Carya	sp.	Hickory	Nut	1
B008	Juglandaceae	Carya	sp.	Hickory	Nut	whole, with husk
B009	Juglandaceae	Carya	sp.	Hickory	Nut	1
B010	Juglandaceae	Juglans	sp.	Walnut	Nut	1
B011	Juglandaceae	Juglans	sp.	Walnut	Nut	1
B025	Juglandaceae	Carya	sp.	Hickory	nut	Two, whole with husk
B044	Fagaceae	cf. Quercus	phellos		leaves	
B045	Cucurbitaceae		sp.		stem	
B046	Cucurbitaceae			Squash/pumpkin	peduncle (stem)	1
B047	Cucurbitaceae	Cucurbita	sp.	Squash/pumpkin	fruit wall	
B050	Vitaceae	Vitis	sp.	Grape	stem/vine	1
B051	Poaceae	Zea	mays	Corn/maize	cob fragment	1
B058		Unidentified			leaf	
B059	Fagaceae	cf. Fagus	grandifolia	American beech	leaf	leaf, cf. American Beech
B060		Unidentified			leaves	
B061		Unidentified			leaf fragment	1
B063		Unidentified			leaf fragment	1
B064		Unidentified			fibers	possibly identifiable
B065	cf. Fagaceae	cf. Fagus	grandifolia		leaf fragment	

JR 2158AB

Number	Family	Genus	Species	Common name	Part	Note
B013	Fagaceae	Quercus	sp.	Oak	acorn fragment	
B014	Juglandaceae	Carya	sp	Hickory	nut	whole, with husk
B015	Hamamelidaceae	Liquidambar	styraciflua	Sweetgum	Fruit	1
B016	Asteraceae	Xanthium	strumarium L. var. canadense	Common cocklebur	achene (bur)	1
B017	Juglandaceae	Carya	sp.	Hickory	nut	1
B018	Juglandaceae	Carya	sp	Hickory	nut	1
B019	Passifloraceae	Passiflora	incarnata cf. serotina or virginiana	Maypop/passionfruit	seed	2
B020	Rosaceae	Prunus	cf. serotina or virginiana	Cherry	stone	
B022	Vitaceae	Vitis	sp	Grape	seed	4
B023		Unidentified			bud	1
B024	Vitaceae	Vitis	sp.	grape	seed	1
B024		Unidentified			seed fragment	1, possibly identifiable with further research
B025	Rosaceae	Prunus	sp	Plum	stone	1
B026		Dung				1
B027	Fabaceae	Phaseolus	vulgaris	Common bean		1
B028		Dung				cf. herbivore dung
B029		Dung				4
B030	Ebenaceae	Diospyros	virginiana	Persimmon	seed	3
B031		Unidentified				tuber fragment?
B032	Juglandaceae	cf. Carya	glabra	pignut hickory	nut	1
B033	Aceraceae	Acer	sp.	Maple	seed	1
B034	Cucurbitaceae	Cucurbita	pepo	Pumpkin/squash	seed	8
B035	Vitaceae	Vitis	sp.	Grape	seed	1
B036	Cornaceae	Nyssa	sp	Blackgum	seed	2
B037		Dung?				could confirm dung id if broken
B038	Fagaceae	Quercus	sp.	Oak	fruit (acorn), cap and shell fragments	
B039	Fagaceae	Fagus	grandifolia	American beech	involucre fragment (fruit)	
B040		Dung				1, cf. herbivore dung
B048		Unidentified			vine/tendril	
B049		Faunal				bone?
B054		Unidentified			leaf fragment	1
B056		Unidentified			stem	
B057	Fagaceae	cf. Fagus	grandifolia	American beech	leaves	2
B062		Unidentified				grass-like fiber or stem
B066	Cucurbitaceae	cf. Lagenaria	sp.	Bottle gourd	seed	add. piece in bag not identified

JR 2158AC

Number	Family	Genus	Species	Common name	Part	Note
B052	Magnoliaceae	cf. Magnolia	sp.	Magnolia	leaf	1
B053	Fagaceae	cf. Quercus				leaf, cf. Red Oak
B055		Unidentified				

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