Carbonised plant macrofossils from Deskford

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Introduction

This report summarises the carbonised plant macrofossils recovered from 12 bulk samples analysed in detail. The analysis had 3 research aims: 1) to retrieve material for ^{14}C purposes, 2) to assess the range of plant macrofossils in the samples and 3) to identify any unusual sample assemblages from the site.

Methods

The samples were taken in the field on a *judgement* sampling basis (Jones, 1991), meaning the bulk samples were chosen by the site excavator. The bulk samples were processed using a flotation tank (Kenward *et al.* 1980) with the residue held by a 1.0 mm net and the flot caught by 1.0 and 0.3 mm sieves respectively. All the flots and residues were dried and scanned using low-powered stereo/binocular microscope at x15-x80 magnification. 70 bulk samples were initially scanned and only 12 contained sufficient quantities of carbonised remains to warrant further analysis. All identifications were checked against botanical literature and modern reference material from collections in the Department of Archaeology, University of Edinburgh. Nomenclature follows Stace (2000), with ecological information taken from Clapham *et al*. (1989) and Grime *et al*. (1988).

Charcoal identifications were made using a binocular microscope at magnifications ranging between x10-200. Generally, identifications were carried out on transverse cross-sections on charcoal measuring between 4-6mm. Anatomical keys listed in Schweingruber (1992), in-house reference charcoal and slide mounted micro-sections were used to aid identification. Asymmetry, morphological characteristics and ring counts were recorded. Timber is used as a term for charcoal fragments with no curvature of the rings in transverse section, whilst roundwood is used as a term of reference for branch and roundwood with clear curvature of the rings in transverse section. Up to 20 fragments were identified for each sample, except for the sample from C.592 where 50 hazel roundwood fragments were analysed to assess the possibility of woodland management.

Results

Table AB1 presents the identified carbonised plant macrofossils from the samples, with Table AB2 presenting the charcoal identifications. Figure AB1 presents the preservation of the total cereal grain assemblage, following the preservation index outlined by Hubbard and al Azm (1990). Figure AB2 presents the ring counts from the 50 roundwood fragments from C.592.

Discussion

Research Aim 1: ^{14}C sample selection

A number of single-entity macrofossils from short-lived plant parts (cereal grains, hazelnut shells, limited-age charcoal roundwood fragments) were chosen for possible ^{14}C dating. The macrofossils were chosen on the basis of the following criteria: 1) good preservation of plant macrofossil, reducing the risk of sample residuality, 2) context coherency, in terms of stratigraphic position and lack of sedimentary disturbance, and 3) availability of suitable dating material in contexts that the excavator wanted to date. The ^{14}C results are presented in the appropriate sections of the published paper.

Research Aim 2: Archaeobotanical summary

The samples chosen for detailed analysis are from 3 sets of samples: 1) mid Bronze Age ring ditch and cremation, 2) Roman Iron Age ditch fills and 3) a few pit fills of unknown date.

Preservation and taphonomy

It is assumed that most of the material in the Roman Iron Age ditch fills and the pit fills of unknown date have been re-deposited into the fills from other areas of activity. This activity could be domestic in nature, representing the varied range of activities preserved in domestic hearth sweepings. The fills of the Mid Bronze Age ring ditch surrounding the cremation deposits presumably relate to the burning activities of the cremation. Figure AB1 presents the generally poor preservation of the cereals recovered from the site, a function of the high-temperature preservation conditions likely in hearths and cremations burning wood.

Summary interpretation

There is no clear differentiation between phases for different fuels for burning, with most of the wood stemming from a relatively restricted range of trees and shrubs. The species represented included alder (*Alnus* sp.), birch (*Betula* sp.), Hazel (*Corylus avellana* L.) oak (*Quercus* sp.) and a few fragments of Heather (*Calluna vulgaris* L.), willow (*Salix* sp.) and Pomoideae spp. (undifferentiated). All are common woodland plants throughout much of the Holocene in Britain, though it is interesting to note the affinity of alder and willow to bog habitats, in relation to the proximity of the site to a bog in prehistory. Also birch and Hazel are common pioneer or scrub woodland plants, though oak is more indicative of well-developed mature woodland.

The cereal grains recovered are usual for their dated time period (Boyd, 1988; Dickson & Dickson, 2000), with barley (*Hordeum* sp.) being the most common cereal recovered. A single grain of Emmer wheat (*Triticum dicoccum* L. Schubl.) was recovered from one of the Mid Bronze Age cremation deposits (C.84), which again is a common cereal found in Neolithic and Bronze Age sites in Scotland (Bishop *et al.*,

2009). Oat grains (*Avena* sp.) and hulled barley (*Hordeum* sp.) were recovered from two of the undated pit fills, suggesting that these may date to the post-Roman to post-Medieval period. The only potential cereal chaff recovered were some cereal-sized culm bases that may indicate uprooting of the crop but this can also indicate the limited burning of turf as a fuel, with large grass culm bases being carbonised in this process (Church *et al*., 2007).

The wild species recovered from the samples are small in concentration and diversity and most were probably grown in disturbed ground, perhaps as part of the cereal crop. Two fragments of hazel nuts (*Corylus avellana* L.) were also recovered, which are ubiquitous across sites of all periods in Scotland (Bishop et al. 2009, 2014, 2015; Dickson & Dickson 2000).

Research Aim 3: Unusual sample assemblage in C.592

An unusual sample was recovered from one of the ring ditch fills surrounding a Mid Bronze Age deposit (C.592). It seems to have contained almost 1000 fragments of Hazel roundwood (*Corylus avellana* L.) from a single c.6 litre sample of the deposit. 50 roundwood fragments were sub-sampled from this assemblage and all of them were well-preserved pith-to-bark roundwood samples, meaning accurate ring counts from the branches could be obtained. Figure AB2 presents the ring counts and a couple of key points can be noted. Firstly, there are two peaks in the counts at 9-10 years and 17 years and secondly there are no branches older than 18 years. This latter point is important, as Out *et al*. (2013, 2018) demonstrate that woodland management in the form of coppicing or specific branch size selection can be identified when there is an age cap in the sampled assemblage, in this case at 18 years. Coppice cycles of 15-20 were common in Medieval Britain for the production of firewood (Rackham 2000). Bishop *et al*. (2015) argue that coppicing was practised in Scotland from the Mesolithic onwards as a form of human niche construction and it is certainly an established practice across Britain and north-west Europe by the Neolithic (Rackham 2000; Out *et al*. 2013). The use of coppiced or carefully selected hazel branches and roundwood as the sole fuel for a cremation burning episode raises intriguing questions over the nature of activities that were undertaken prior and during the firing of the cremation.

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Context		84	92	93	95	592	595	346	347	420	552	978	1192
Feature		83	93	93	94	710	699	386	386	386	553	972	1103
Period		MBA	MBA	MBA	MBA	MBA	MBA	RIA	RIA	RIA	?	?	?
Context type		crem	df	df	df	df	df	df	df	df	pf	pf	pf
Volume (litres)		6.2	4.4	1.9	4.1	5.7	5.8	130.3	11	4	5.5	1.3	5.4
Cultivated species	**Common name**												
Hordeum sp. (c)	Barley grain			1	1	7	10	21				7	
H. naked (c)	Naked barley grain			2	2	5	9	2					
H. naked symmetric (c)	Naked barley straight grain				1		1						
H. naked asymmetric (c)	Naked barley twisted grain				3		4	4					
H. hulled (c)	Hulled barley grain											5	
H. hulled symmetric (c)	Hulled barley straight grain											1	
Triticum sp. (c)	Wheat grain		1				1						
T. *dicoccum* L. Schubl. (c)	Emmer wheat grain	1											
Avena sp. (c)	Oat grain											14	1
Cereal indeterminate (c)	Indeterminate cereal grain				4	2	10	22	1	1		16	
Chaff	**Total grain**	1	1	3	11	14	35	49	1	1	0	43	1
Cereal/monocotyledon (>2 mm.) (cb)	Cereal sized culm base			1					1	18			
Wild species	**Total chaff**	0	0	1	0	0	0	0	1	18	0	0	0
Brassica/Sinapis spp. (s)	Cabbage/Mustard seed					2		1	2	5	3		
Chenopodium album L. (s)	Fat-hen seed						1						
Chenopodium/Atriplex spp. (s)	Goosefoot/Orache seed									1			
Corylus avellana L. (nf)	Hazelnut nutshell fragment					1F				1F			
Eleocharis palustris (L.) R & S (n)	Common spike-rush nutlet				2	2	2				3		
Galeopsis subg. Galeopsis (n)	Hemp-nettle nutlet						1						
Galeopsis tetrahit L. (n)	Common hemp-nettle nutlet									1			
Galium aparine L. (f)	Cleaver fruit				2	7							
Poaceae undiff. (medium) (c)	Grass grain						1	1					
Poaceae undiff. (small) (c)	Grass grain					2							
Polygonum aviculare L. (n)	Knotgrass nutlet						1						
Polygonum spp. (n)	Knotgrass nutlet					2							
cf. *Potentilla* sp. (a)	Cinquefoil achene										1		
Ranunculus spp. (a)	Buttercup achene						1	2	1	1			
Rumex acetosella L. (n)	Sheep's sorrel nutlet		1						1				
Rumex obtosifolius/crispus L. (n)	Broad leaved / curled dock nutlet								1				

cf. *Silene* sp. (f)	Campion fruit										1		
Spergula arvensis L. (s)	Corn-spurrey seed							5					
Stachys spp. (f)	Woundwort fruit									1			
Cereal/monocotyledon (<2 mm.) (cn)	Small culm node	2									7	1	
Cereal/monocotyledon (<2 mm.) (cb)	Small culm base				2	1			2	4	21		
Indeterminate (>2 mm.) (r)	Rhizome	1	1					1					
Indeterminate (<2 mm.) (r)	Rhizome							1	1	3	4		
Indeterminate (s/f)	Indeterminate seed/fruit	1	1	1	1	4	1	5		1		1	
Indeterminate (trigonous) (s/f)	Indeterminate seed/fruit										1		
Fungal sclerotia	Fungal sclerotia					P		P	P	P	P	P	P
	Total wild	4	3	1	7	20	8	16	8	17	41	2	0
	Total QC	5	4	5	18	34	43	65	10	36	41	45	1
	QC/litre	0.8	0.9	2.6	4.4	6.0	7.4	0.5	0.9	9.0	7.5	34.6	0.2

Table AB1: Carbonised plant macrofossils by sample

Key: a = achene, c = caryopsis, cb = culm base, F = fragment, fr= fruit, n = nutlet, nf = nutshell fragment, P = present, r = rhizome, s = seed

Context		84	92	93	95	592	595	346	347	420	552	978	1192
Feature		83	93	93	94	710	699	386	386	386	553	972	1103
Period		MBA	MBA	MBA	MBA	MBA	MBA	RIA	RIA	RIA	?	?	?
Volume (litres)		6.2	4.4	1.9	4.1	5.7	5.8	130.3	11	4	5.5	1.3	5.4
Total fragments in fraction		18	20	20	20	20	20	20	20	14	12	3	20
Total fragments		18	86	48	94	920	150	380	32	14	12	3	90
% of sample identified		100	23	42	21	2	13	5	63	100	100	100	22
Deciduous roundwood	**Common name**												
Alnus sp. roundwood	Alder roundwood		1F(0.02)		6F(0.13)			3F(0.13)	1F(0.03)	2F(0.03)	1F(0.05)		
Betula sp. roundwood	Birch roundwood		2F(0.07)				5F(0.25)	3F(0.41)					5F(0.1)
Calluna vulgaris L. roundwood	Heather roundwood									4F(0.12)			
Corylus sp. roundwood	Hazel roundwood		7F(0.39)	7F(0.42)	8F(0.27)	20F(2.00)	12F(0.8)	1F(0.03)					5F(1.34)
Salix sp. roundwood	Willow roundwood									1F(0.04)			
Deciduous timber													
Alnus sp.	Alder timber		6F(0.14)	4F(0.11)	1F(0.02)			5F(0.95)	3F(0.16)				

Betula sp.	Birch timber	4F(0.25)		4F(0.23)			1F(0.03)		7F(0.25)	4F(0.22)	4F(0.09)		5F(0.27)
Corylus sp.	Hazel timber	2F(0.03)		3F(0.07)	1F(0.04)				2F(0.06)		1F(0.02)		2F(0.57)
Pomoideae undiff.	Pomoideae undifferentiated										1F(0.02)		
Quercus sp.	Oak timber	2F(0.13)		1F(0.02)				3F(0.11)	1F(0.04)		2F(0.12)	1F(0.02)	
Indeterminate													
Amorphous burnt plant material		7F(0.2)											
Bark			2F(0.05)										
Dicotolydenous timber		2F(0.01)	2F(0.03)	1F(0.01)	3F(0.11)		2F(0.03)	4F(0.15)	5F(0.16)	3F(0.04)	2F(0.03)	2F(0.05)	
Indet. roundwood/rootwood		1F(0.03)			1F(0.04)			1F(0.02)	1F(0.06)		1F(0.03)		3F(0.15)

Table AB2: Charcoal fragments identified by sample

Key: xF(x.xx) = Number of fragments(mass of fragments in g.)

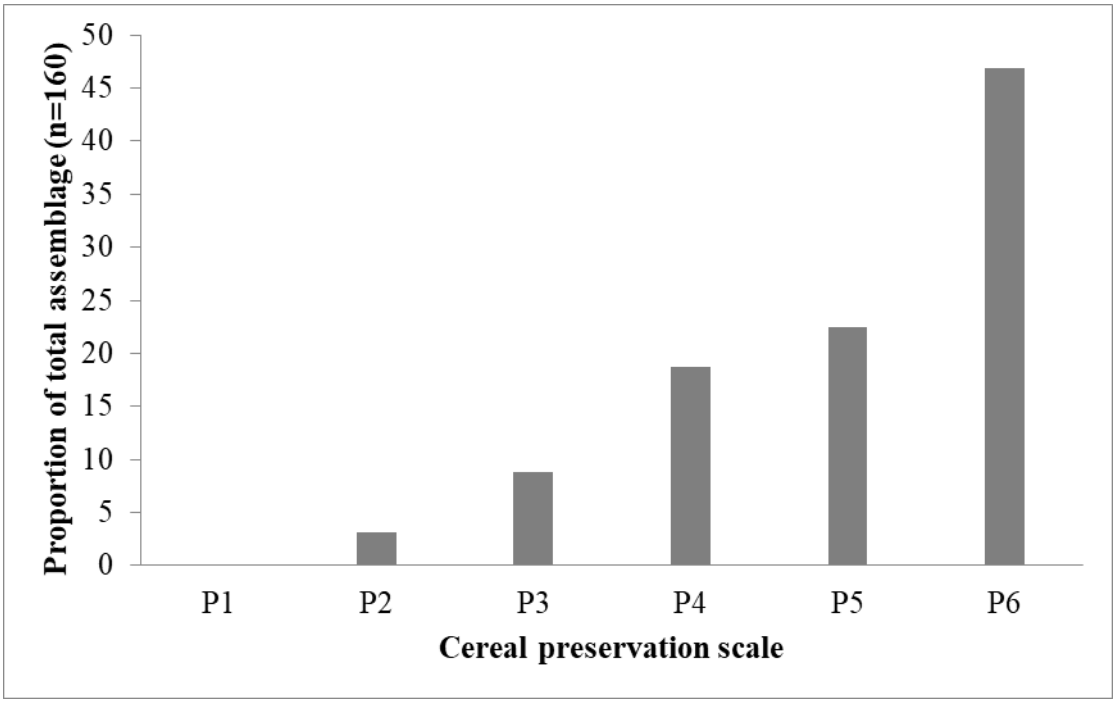

Figure AB1: Cereal grain preservation, following Hubbard and al Azm (1990)

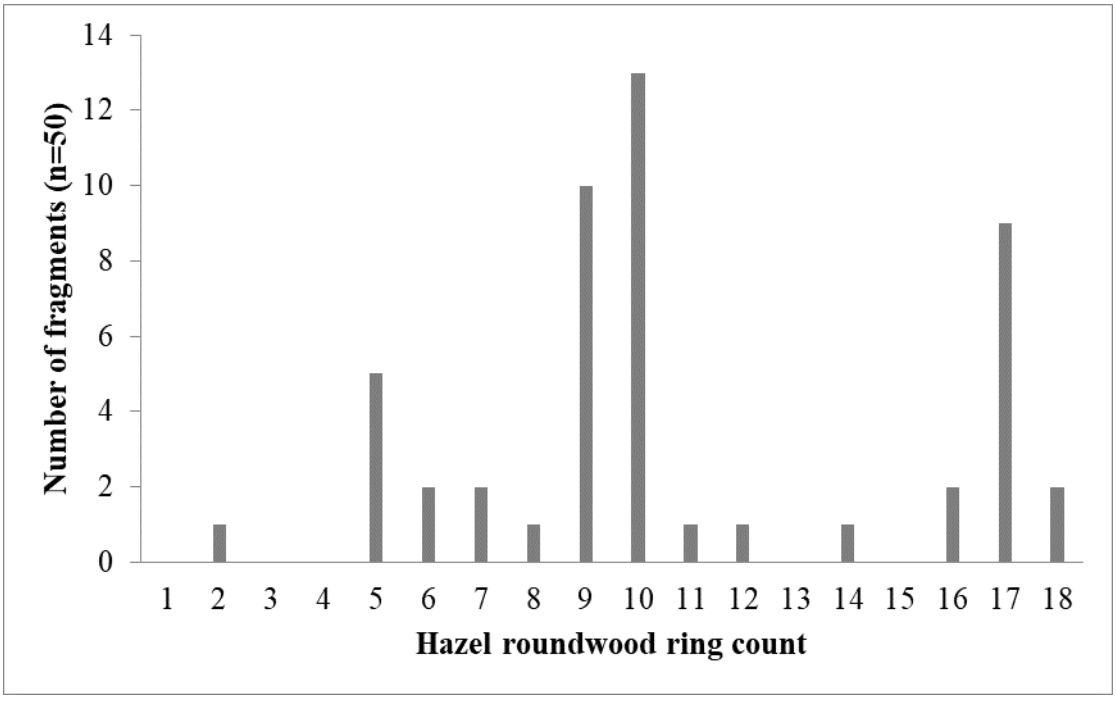

Figure AB2: Ring count data from 50 roundwood fragments from c.592.