

## ENVIRONMENTAL REPORTS

### Environmental Samples

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#### ***Introduction***

Twenty bulk soil samples were taken during the excavation at Brightwell-cum-Sotwell in Oxfordshire in 2018. Eight samples were taken from Area 1 of the site of which six have been analysed, the remainder being from features that were Post Medieval in date. Twelve samples were taken from Area 2 of which eight were analysed, the remainder being from features that were either Post Medieval or of uncertain date. The samples were taken primarily for the retrieval of Charred Plant Remains (CPR) and artefacts.

#### ***Method***

The bulk samples were processed in their entirety using a modified Siraf-type water flotation machine to 250µm (flot) and 500µm mesh (residue). The residue fractions were sorted by eye and all bone and artefacts removed while the flot material was sorted using a low power (x10) binocular microscope to extract cereal grains and chaff, smaller seeds and other quantifiable remains. Identifications were carried out using standard morphological criteria for the cereals (Jacomet 2006) and with reference to the Digital Seed Atlas of the Netherlands (Cappers et al. 2006) for identification of wild plant remains, as well as comparison with modern reference material. Classification and nomenclature of plant material follows Stace (2010).

Quantification of remains is as follows; cereal grains and the seeds of wild plants were only quantified for items of which more than half was present, this means that all cereal and seed counts may be used to reach an MNI (Minimum number of individual seeds). For legumes, chaff and nutshell fragments the count is for all observed fragments, this means these figures are not suitable for use in calculating MNI.

#### ***Results and Discussion***

Table 1 lists the charred taxa identified from each sample in Area 1, table 2 lists for Area 2.

##### *Area 1*

Samples 1 – 6 originate from Area 1 of the site which has features of predominantly middle Iron Age date although ditch 144 has been dated to the Bronze Age/Early Iron Age. The samples from this area produced generally small flots with little charred material accompanied by fine modern roots and occasional modern seeds and insects. The charcoal is generally small in size with some external encrustation which varies between samples, while the cereal grain is in generally poor condition with a clinkered appearance, although occasional better preserved grains are present. Glume base fragments from either emmer or spelt wheat (*Triticum dicoccum/spelta*) are frequent in middle Iron Age samples 1 and 4 and small awn fragments, pieces of rachis internodes and rare fragments of oat floret are

also present although these did not include the bases which would have enabled identification to species. The majority of samples from this area contain small numbers of non-cultivated plant seeds, generally in poor condition, but these are more common in samples 1 and 4.

### **Area 1 (Eastern Area)**

#### *Bronze Age-Early Iron Age*

Two samples (sample 5 and sample 6) were taken from the fills of ditch 144 which runs in a Northwest-Southeast direction before being cut by a Post Medieval boundary ditch. Both samples produced only a small quantity of small-sized charcoal which is likely to be the result of secondary deposition of burnt material from elsewhere.

#### *Middle Iron Age*

The remaining samples came from discrete features positioned to the North and South of the Post Medieval boundary ditch. While samples 2 and 3 are posthole fills which contain small quantities of charred material probably originating from the secondary deposition of small fragments filtering in through voids in the matrix, sample 3 from posthole 92 contains charcoal of a larger size than the other features in this area and it is possible that this is a result of the burning of the post that it originally contained. The charcoal from this sample, identified by J. Meen) is predominantly oak (*Quercus*), but there are also very small fragments of diffuse porous roundwood, suggesting not all charcoal derives solely from the post. This may be interpreted as the remains of a burnt oak post with a little background material or just general fuel waste.

Samples 1 (Pit 30) and 4 (Pit 131) contain the largest charred assemblages from this area of the site including a mixture of cereals, represented by grain (mainly wheat with smaller quantities of barley (*Hordeum* sp. including an example of *Hordeum* cf. *vulgare*) and oats (*Avena* sp.) as well as cereal chaff. These were accompanied by smaller seeds from uncultivated plants, many of which may have grown as weeds within the crops. Oat/brome (*Avena/Bromus*), vetches, cleavers (*Galium aparine*) and mayweed (*Tripleurospermum* sp.) as well as grasses (Poaceae) and various members of the daisy family (Asteraceae) are commonly observed within assemblages of this type and date (Parks 2012, Campbell 2005). Rushes (*Juncus* sp.) and sedges (*Carex* sp.) are generally indicative of damp conditions but they are present in small numbers and may just reflect plants growing around the edges of fields close to damper contexts such as ditches.

Glume wheat chaff frequently forms the largest part of charred assemblages on Iron Age sites as a result of the frequent practice of storing grains in the glume (Hillman 1981, Jones 1985). Consistent with this, wheat glume base fragments form the majority of charred material in samples 1 and 4. In addition, smaller quantities of wheat/barley and oat awns as well as rachis internode fragments are present. It is likely that that this material is waste from crop processing activities such as threshing or dehusking. Experiments have shown that straw remains and rachis internodes are under-represented after charring compared

with glume wheat chaff and cereal grains (Boardman and Jones 1990), so it is possible that this assemblage represents early crop processing waste.

Unfortunately, the glume base fragments are on the whole not further identifiable although occasional fragments bear some of the identifying characteristics of spelt wheat (*Triticum spelta*). It is likely that the majority of the wheat on this site is spelt since in the south and east of Britain this was the most common cultivar during the Iron Age and Roman periods, with barley as the secondary crop (van der Veen 1992).

It would seem likely, then, that the charred remains in pits 30 and 131 represent material from crop processing being disposed of within an open pit. While some detached embryos are present these do not appear to be sprouting and are likely to have become detached accidentally through abrasion of the grains, perhaps during threshing. The cereal grains themselves are relatively few and are likely to be accidental discards.

Sample No		1	2	3	4	5	6
Context No		31	33	93	132	130	129
Feature		30	32	92	131	128	128
Group		-	-	-	-	144	144
Area		1	1	1	1	1	1
Description		Single fill of Pit	Single fill of Posthole	Single fill of Posthole	Secondary fill of Pit	Upper fill of Ditch	Lower fill of Ditch
Date		MIA	MIA	MIA	MIA	BA/EIA	BA/EIA
Volume (L)		40	1	10	30	25	30
Flot Volume (ml)		60	3	50	30	15	5
Flot Analysed		100%	100%	100%	100%	100%	100%
Charcoal							
	>4mm	**		***	**		
	2-4mm	***		***	***	*	
Cereal grain							
<i>Triticum sp.</i>	wheat	11#		1#	17#		
<i>cf Triticum sp.</i>	cf. wheat	2#	1#		3#		
<i>Hordeum sp.</i>	barley				3#		
<i>cf Hordeum sp.</i>	cf. barley				1#		
<i>Avena sp.</i>	oat	4#			11#		
<i>Avena/Bromus</i>	oat/brome	29#			26#		
Cerealialia	indet cereal	55#	1#	4#	53#		
Chaff							
<i>Triticum dicoccum/spelta</i>	emmer/spelt glume base	434#	1#		380#		
<i>Triticum/Hordeum</i>	rachis fragments	9#	1#		15#		
<i>Triticum/Hordeum sp.</i>	wheat/barley awns	**			**		
<i>Triticum sp.</i>	wheat awns	*			*		

Sample No		1	2	3	4	5	6
<b>Context No</b>		31	33	93	132	130	129
<i>Avena sp.</i>	oat awns	***			***		
<i>Avena sp.</i>	oat floret fragment	2#					
<i>Cerealia</i>	indet detached embryos	13			3		
<b>Fruit, Nutshell etc</b>							
Indet	Indet nutshell/fruitstone fragment	1#					
<b>Wild Species</b>							
Fabaceae	pea family (small)	7#			1#		
<i>Vicia/Lathyrus sp. &gt;2 mm</i>	vetch/vetchling/tare etc	5#	1#		4#		
<i>Vicia/Lathyrus sp. &lt;2 mm</i>	vetch/vetchling/tare etc	23#			17#		
<i>Rumex sp.</i>	docks	2#		4#	9#		
<i>Rumex acetosella</i>	sheep's sorrel	4#					
<i>Stellaria media</i>	common chickweed		1#				
<i>Chenopodium album</i>	goosefoot			1			
<i>Montia fontana</i>	blinks	3#			2		
<i>Galium aparine</i>	cleavers	9#					
<i>Veronica hederifolia</i>	ivy-leaved speedwell	3#					
<i>Teucrium sp.</i>	germander				1		
Asteraceae	daisy family	11#					
<i>Anthemis cotula</i>	stinking chamomile			1#	1		
<i>Leucanthemum/Tripleurospermum sp.</i>	oxeye daisies/mayweed	31#					
<i>Juncus sp.</i>	rushes	5#			7#		
<i>Carex sp.</i>	sedges				3#		
Poaceae	grass seeds (various)	18#			25#		
<b>Other</b>							
Indet.	seed/fruit	10#		4#	11#		
# Majority fragmented, vitrified or missing some external indicators. *1-5, **5-25, ***25-50, ****50-100, *****100+							

Table 1: The Charred Remains from Area 1

## Area 2

Samples 2000 – 2012 came from Area 2, again from Bronze Age and middle Iron Age features. The flots are similar to those from Area 1, again including fine modern roots and occasional modern seeds and insects (Table 2). As for Area 1, the majority of cereal grain is in poor condition with a clinkered appearance, although occasional better preserved grains are present. Most samples contain small quantities of cereal chaff but glume bases are relatively common in samples 2000, 2004 and 2008 and several samples also contain small oat awn fragments, detached embryos and occasional pieces of rachis internodes. Most of the samples include small numbers of non-cultivated plant seeds, of which vetches

(*Vicia/Lathyrus* sp.) are the most common, although many of these wild plant seeds are also in poor condition

## **Area 2 (Western Area)**

### *Middle Bronze Age*

Sample 2012, a pot fill from pit 2103, is the only sample from this period from Area 2. Containing only a small amount of charred material, in generally poor condition, the remains are not likely to represent the original pot contents, i.e. food remnants or part of a cremation burial and are instead likely to be from the backfill of the pit.

Few plant assemblages predating the late Bronze Age have been published for this region (Lambrick & Robinson 2009; Boardman forthcoming) so even the paltry evidence from sample 2012 is significant, indicating the cultivation of emmer or spelt and probably barley. Generally, glume wheat (especially emmer), free threshing wheat and hulled barley were cultivated across the region during the Early/Middle Bronze Age (Boardman, forthcoming).

### *Middle Iron Age*

The remaining analysed samples from this area are all dated to the middle Iron Age period and are all from discrete features situated towards the South of the area with the exception of sample 2011 which came from a ditch fill in the Northern part of Area 2.

Ditch 2312 is a curvilinear ditch which has been cut by several later features obscuring its full extent. It is possible that this is the surviving part of a circular enclosure and the small amount of charred material present within the sample is likely to be the result of secondary deposition, a combination of windblown and silted in material.

Samples 2000, 2001 and 2002 all originated within the same pit (2157) with sample 2000 forming the basal fill and the other two fills being secondary fills above. The charred material from all sampled fills is similar and together with the animal bone and pottery appears to originate in dumps of waste material from settlement activity. The composition of the cereal assemblage is similar to that described for the middle Iron Age samples from Area 1, being predominantly glume wheat with occasional barley. Seeds of plants typically found in wet places such as rushes, sedges and bristle club-rush (*Isolepis setacea*) again suggest cultivation of damp soils although rushes may derive from flooring or thatch. Stinking chamomile (*Anthemis cotula*), a weed of crop identified in all three samples, is typically found on heavier soils in central and southern England (Clapham et al. 1987) while other uncultivated plants in the assemblage such as docks (*Rumex* sp.), cleavers (*Galium aparine*) and small legumes (eg *Vicia/Lathyrus* spp., *Medicago* sp.) are typically found in arable fields and waste places.

Generally, the organic material within this feature appears to represent domestic waste from the earlier stages of food processing, this can be seen both in the amount of waste plant material (cereal chaff, especially glume base, and weed seeds) and in the nature of some of the animal bones (mandibles, teeth, foot bones and skulls; Allen this report).

Sample 2008, which from the lower fill of pit 2166, has a similar assemblage composition to sample 2000 and is likely to have originated in the same way.

Sample 2005 which came from the lower fill of pit 2137 produced the richest charred assemblage from a pit fill on this site in terms of the quantity of both grain and uncultivated plant seeds although chaff is relatively rare, perhaps suggesting a partially cleaned product containing uncultivated plant seeds removed by sieving. As with the other pit fills this is likely to be a dump of waste material accompanied as it is by large amounts of pottery fragments. The charred cereals are a fairly even mix of wheat and barley. A single large legume is insufficient to ascertain if these were also grown as a crop. Unfortunately, peas and beans are rarely processed in a manner that would make them likely to be carbonised and so there is a bias in their preservation on archaeological sites (Treasure & Church 2016). The small quantity of hazelnut together with the single red deer molar may indicate utilisation of wild resources.

In contrast to the pit fills, sample 2004 from posthole 2220 is extremely rich in charred remains despite the original soil sample being only 5 litres. The sample comes from the 'postpipe' of the feature and as such was expected to contain the charcoal from the destruction of the post contained within, however the material extracted comprised large amounts of chaff and cereal grain, predominantly wheat (*Triticum* sp.) and barley (*Hordeum* sp.), together with small numbers of seeds from uncultivated plants. Glume bases from emmer or spelt (*T. dicoccum/spelta*) suggest that the indeterminate grains are likely to be mainly of these types. It is unusual to find such a quantity of non-wood related charred material within a posthole and the logical interpretation must be that this is material from within or related to the structure, assuming that the feature is indeed a post-hole.

The evidence from early to middle Iron Age features at nearby Didcot Great Western Park indicates that a range of cereals were grown locally at this time, including spelt and hulled barley as well as some emmer wheat, but generally spelt and hulled barley were the cereals most commonly grown in the region at this time (Boardman, forthcoming). Typically, as at Brightwell, samples include a significant amount of crop processing waste, demonstrating the likelihood that cereals were cultivated locally.

*Table 2: The Charred Remains from Area 2*



Sample No		2000	2001	2002	2004	2005	2008	2011	2012
Context No		2158	2159	2182	2222	2208	2167	2293	2104
<b>Fruit, Nutshell etc</b>									
Fabaceae >4mm	pea/bean					1			
<i>Corylus avellana</i>	hazelnut shell	1#						2#	
<b>Wild Species</b>									
<i>Vicia/Lathyrus</i> sp. >2 mm	vetch/vetchling/tare etc			1	2#	11#			
<i>Vicia/Lathyrus</i> sp. <2 mm	vetch/vetchling/tare etc	2#		5#	1#	43#	12#	3#	1#
<i>Medicago</i> sp.	medicks					1#			
<i>Rumex</i> sp.	docks				2#	1#		1	
<i>Stellaria media</i>	common chickweed								1#
Amarantheaceae	goosefoot family			1#		1#			
<i>Chenopodium album</i>	goosefoot				1#	2	3		
<i>Galium aparine</i>	cleavers	2					2		
Asteraceae	daisy family					6#		1#	1#
<i>Anthemis cotula</i>	stinking chamomile	2	1	2		2			1
<i>Leucanthemum/Tripleurospermum</i> sp.	oxeye daisies/mayweed						1#		
<i>Sambucus nigra</i>	elder					1			
cf <i>Allium</i> sp.	cf onion	1#							
<i>Juncus</i> sp.	rushes	1				1	1		
Cyperaceae	sedge family	1							
<i>Isolepis setacea</i>	bristle club-rush	1		1			3#		
Poaceae	grass seeds (various)	4	2#	2		3#	5#		
<b>Other</b>									
Indet.	seed/fruit	2#			1#	7#	2#	3#	2#
Indet	coleoptiles	1#	1#						
# Majority fragmented, vitrified or missing some external indicators. *1-5, **5-25, ***25-50, ****50-100, *****100+									



## *Conclusion*

Generally, this assemblage is consistent with small scale cereal cultivation and processing at the site during the middle Iron Age and, tentatively, during the middle Bronze Age.

Given the similarity in both cereals and uncultivated plants, albeit in very small amounts in the middle Bronze Age sample, it seems likely that there was a continuation of farming practices between the two periods although there is always the possibility that the small amount of material in the Bronze Age sample could be intrusive. The primary crop in both periods seems to have been wheat (unfortunately not identifiable beyond emmer/spelt), with barley (probably hulled) as a secondary crop.

Chaff, such as the glume bases found in features across the site, would seem to indicate small scale crop husbandry with grain storage, largely in the glume, for domestic consumption. Gradual crop processing done on a monthly or even weekly basis would explain the ubiquity of the material with it being disposed of in a piecemeal fashion rather than in an organised manner. It would also explain the majority of these samples as being the waste from these processes, burned for disposal and then gradually accumulating in pits and ditches as cleaning of areas of cooking and processing occurred.

## APPENDIX C      BIBLIOGRAPHY

Barker, G and Gamble, C (eds.) 1985 *Beyond Domestication in Prehistoric Europe*. Academic Press. London.

Boardman, S J (forthcoming) Charred plant remains, in C. Hayden, A. Simmonds, S. Lawrence, R. Masefield and K. Wheaton, Great Western Park, Didcot, Oxfordshire: phase 1 excavations, 2010-2012

Boardman, S and Jones, G E M, 1990 Experiments on the effects of charring on cereal plant components, *Journal of Archaeological Science* 17(1), 1-12

Campbell, G with Straker, V 2005 *A Review of macroscopic plant remains studies in Southern England*.

Cappers, R.T.J, Bekker R.M, and Jans, J.E.A 2006 *Digital Seed Atlas of the Netherlands*. Groningen Archaeological Studies 4, Barkhuis Publishing, Eelde, The Netherlands.  
[www.seedatlas.nl](http://www.seedatlas.nl)

Clapham A R, Tutin T G, Moore D M, 1987 *Flora of the British Isles*, 3<sup>rd</sup> edn, Cambridge University Press, Cambridge.

Hillman, G. C. 1981 Reconstructing crop husbandry practices from charred remains of crops. In R. Mercer (ed.) *Farming Practice in British Prehistory*, 123–162. Edinburgh, Edinburgh University Press.

Jacomet, S 2006 *Identification of cereal remains from archaeological sites* (2nd edition). Archaeobotany Lab, IPAS, Basel University.

Jones, M K 1985 Archaeobotany beyond subsistence reconstruction. in *Beyond Domestication in Prehistoric Europe*. By G.W.W. Barker and C. Gamble (eds.). Academic Press. London. 107-128.

Lambrick, G and Robinson, M 2009 *The Thames through Time. The Archaeology of the Gravel Terraces of the Upper and Middle Thames. The Thames Valley in Late Prehistory: 1500 BC-AD 50*. Oxford Archaeology; Thames Valley Landscapes Monograph No. 29.

Mercer, R (ed.) 1981 *Farming Practice in British Prehistory*, 123–162. Edinburgh, Edinburgh University Press.

Parks, K 2012 *Iron Age and Roman Arable Practice in the East of England*. Phd Thesis. Leicester.

Stace, C 2010 *New Flora of the British Isles*, 3rd Edition. Cambridge: CUP.

Treasure, E, R and Church, M, J 2016 Can't find a pulse? Celtic bean (*Vicia faba* L.) in British prehistory. *Environmental Archaeology*. 22:2, 113-127.

van der Veen, 1992 Crop Husbandry Regimes – *An Archaeobotanical Study of Farming in northern England 1000BC – AD500*. Sheffield Archaeological Monographs 3. JR Collis.