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FIELDS SOUTH OF SILBURY HILL
THE CHARRED PLANT REMAINS FROM EXCAVATIONS AT THE ROMANO-BRITISH ROADSIDE SETTLEMENT (2010)

Ruth Pelling

INTERVENTION
AND ANALYSIS

ENGLISH HERITAGE

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SUMMARY

This research report makes available the report on the charred plant remain assemblage from the Romano-British roadside settlement to the south of Silbury Hill excavated by English Heritage in 2010. The full excavation report is published in Crosby and Hembrey (2013). Specialist reports are available as part of the English Heritage Research Report Series. A total of 47 samples was taken. Five samples from an enclosure ditch fill of probably 2nd – 3rd century AD date produced possible evidence of malting waste as well as the utilization of wild resources, particularly heather. Other samples from the site produced background scatters of mixed charred material. Differences between the assemblage from the enclosure ditch and that recovered from an earlier excavation to the north of the A4 (Scaife 1996a) suggest different crop processing and disposal activities were taking place in different areas of the settlement.

CONTRIBUTORS

Ruth Pelling

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I would like to thank the on site Environmental Supervisor, Liz Chambers, who oversaw the sorting of residues and processing of samples. Gill Campbell, Vicky Crosby and Nicola Hembrey provided helpful comment and discussion on aspects of the text. Finally thanks go to Hugh Corley for providing kiwi fruit seeds for the reference collection.

ARCHIVE LOCATION

The full digital archive and archaeobotanical samples are stored at English Heritage, Fort Cumberland, Fort Cumberland Road, Eastney, Portsmouth, Hampshire, PO4 9LD

DATE OF RESEARCH

Later Silbury evaluation by English Heritage in 2010. Analysis of the charred plant remains in 2011

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INTRODUCTION

English Heritage's Later Silbury project aimed to shed light on a poorly understood period of activity around Silbury Hill, increasing our knowledge of the Romano-British settlement, and placing it within the wider Avebury and Stonehenge World Heritage Site. An archaeological evaluation was carried out in the late summer of 2010 (Crosby and Hembrey 2013). Seven trenches were opened across the two fields south of the A4 road to investigate features identified in the geophysical surveys carried out between 2005 and 2008 (Linford *et al* 2010). Part of an extensive Romano-British settlement consisting of large enclosures flanking a trackway was examined, as well as post-medieval water meadow features. A comprehensive sampling programme was implemented to recover plant remains as well as other biological material. Romano-British sites are poorly represented in Wiltshire in terms of charred plant material and it was anticipated that any remains recovered would add significantly to the available body of data. Contemporary plant remains have previously been recovered from the Winterbourne Romano-British settlement as part of the Kennet valley Foul Sewer Pipeline excavations (Scaife 1996a).

Aims and Objectives of the Sampling Programme

The recovery of biological remains was intended to contribute towards the principal aims of the excavation, most notably to characterise the Romano-British settlement south of the A4 and to produce as thorough an archive dataset as possible. Specific objectives were as follows:

1. to provide a detailed archive of charred plant remains
2. to examine plant use at the site including crops and wild plant resources
3. to make broad comparisons with the data discussed by Scaife (1996a) from north of the A4
4. to make recommendations for future research and sampling on the site.

Sampling

On-site sampling methods followed the 2002 edition of the EH guidelines for Environmental Archaeology (English Heritage 2002). A total of 47 samples was taken from within the main Romano-British settlement (Trenches 1-5). Samples were taken from most features encountered including ditches, postholes, pits, occupation spreads and the top fill of large circular well 91008. The volume processed for each sample ranged from 1 to 40 litres, but was generally in the range of 30-40 litres, with 100% sampling for smaller contexts. An additional four samples were taken from Trench 8 within the water meadow field, while a series of samples were taken from accumulated alluvial deposits in the river valley (Trench 7, context 97015).

Flotation samples were processed on site by mechanical flotation. Flots were collected on a 0.25mm mesh and residues on a 0.5mm mesh. Dried residues were sieved through a stack of 2mm and 4mm sieves. The >4mm fraction was sorted in its entirety by the environmental supervisor and 25% of the 2-4mm fraction was sorted for environmental remains (charcoal, hazelnut shell etc) and small finds.

Laboratory Methods

Flots were initially assessed by scanning under a stereoscopic microscope at magnifications up to x50. Approximate abundance and provisional identification of seeds, chaff and other quantifiable organic material were recorded. Charred plant remains were present in 28 samples from the Romano-British settlement. Five samples within which charred plant remains were more abundant were sorted in full. Large amounts of modern cereal chaff present were presumably derived from the abundant chaff noted in the fields at the time of the excavation. A number of seeds of modern plants (including single seeds of kiwi fruit and fig) and large fly pupae cases are likely to have been introduced to the field during recent manuring. No charred material was present in the samples from the features within the post-medieval water meadow (Trench 8) and a single charred indeterminate wheat grain was the only find from the Trench 7 alluvial deposits.

Identifications were based on well established morphological criteria and by reference to modern comparative material in the English Heritage archaeobotanical reference collection held at Fort Cumberland. Nomenclature for wild species follows Stace (1997), and for cereals follows Miller (1987) for wheat and Zohary and Hopf (1994) for barley. Nomenclature for fruits follows Cappers *et al* (2009). Charcoal presence was recorded by estimating the volume of 2 - 4mm and >4mm fragments. A rapid examination of pore distribution in transverse section of selected fragments enabled identification of oak (*Quercus* sp.) and non-oak taxa. Flot material was recorded in the project database (Intrasis) at assessment stage.

Discussion of the Results

The majority of the charred material noted in the samples consisted of grain, chaff or weed seeds numbering fewer than 20 in total, which were identified and quantified at assessment stage (Table 2). More abundant remains, most notably of cereal chaff, were present in five samples (sorted in full) taken from contexts within a length of enclosure ditch 91083, (contexts 91005, 91004, 91010, 91019 and 91018) in Trench 1 (Table 1). These deposits are noticeably rich in finds compared to other features at the site, including metal working debris (slag, hammer-scale), small finds, burnt clay and pottery (Crosby and Hembrey 2013). Pottery of 2nd to 3rd century date suggests the ditch was filled in during the 3rd century, with some 4th century sherds possibly derived from later disturbance. The increased concentration of both plant remains and small finds would suggest this feature was a focus of relatively intensive refuse disposal, potentially

associated with some sort of metal-working or other industrial activity nearby. Preservation of grain was poor, reflected in the high number of indeterminate grains, suggesting high levels of heat, prolonged or repeated exposure to heat/fire and/or post-depositional mechanical damage.

Cultivated plants

Cultivated plants were principally cereal remains, of which chaff generally outnumbered grain. The cereal remains are typical for this period (Campbell 2003; Jones 1981) consisting of hulled wheat (*Triticum spelta/dicoccum*) and barley (*Hordeum vulgare*). The hulled wheat appears to be spelt (*Triticum spelta*), identified on the basis of the chaff (glume bases and spikelet forks). A single glume base was tentatively identified as emmer wheat (*Triticum dicoccum*). Given the paucity of emmer in the samples it is likely to be present as a rogue, relic weed of the spelt wheat rather than a cultivated crop at this site. Grain was tentatively identified to species only if it conformed to 'typical' morphology. In practice the variation in grain shape in ancient wheat is such that identification to species is often tentative (Hillman *et al* 1996). A range of morphology was noted from 'typical' spelt shaped (parallel sides, flat ventral surface, lack of dorsal ridge, blunt apex) to short and rounded grains generally more typical of free-threshing wheat. The presence of slight longitudinal lines on some grain, characteristic of hulled wheat where grain is held within tightly adhering glumes, indicates that some of the short grain was likely to have been a short grained hulled species (emmer or spelt wheat). At least one wheat grain was held within an organic matrix, which could consist of bread or dung, although there was insufficient of the material to make any further identification.

A single rachis node of probable free-threshing wheat (likely to be a bread wheat type, *Triticum aestivum*) was identified, raising the possibility that the grain includes free-threshing wheat varieties. Bread type wheat is occasionally recorded in the Roman period, although is more typical of the Saxon and later periods. Given the presence of medieval activity in the area, including medieval cereals from the 'Winterbourne Site' (Scaife 1996b), West Kennet (Fairbairn 1997) and Silbury Hill itself (Campbell 2013, 292), it is not possible to establish the significance of a single rachis node.

The barley (*Hordeum vulgare*) includes well preserved grain which was clearly hulled, although the majority of the grain was too poorly preserved to enable this level of identification. Single rachis internodes of barley were recovered from each of the five samples analysed. Preservation was insufficient to identify the rachis fragments as being from six- or two-row barley.

One poorly preserved pulse, likely to be a bean or pea (*Vicia faba* or *Pisum sativum*) was recorded (context 91017) and represents the only other cultivated plant from the site.

Wild Resources

Some utilization of wild resources at the site is indicated by the material. Hazelnut (*Corylus avellana*) shell fragments were recovered from the residues of samples from contexts 91004 and 91019. Hazelnuts are likely to have been a readily available food locally throughout the period. A single frond fragment of bracken (*Pteridium aquilinum*) and numerous seed capsules and a smaller number of leaf tips of heather (*Calluna vulgaris*) were recovered from context 91019, with smaller numbers of seed capsules from other samples from this same feature (enclosure ditch 91083). Woody stem fragments in the same contexts are also tentatively identified as heather. Both heather and bracken are typical heathland plants which require somewhat acidic soils. In the area of the North Wiltshire Downs they tend to be associated with areas of clay-with-flints over the chalk, or outcrops of greensand, in some cases forming the dominant vegetation (Rayner *et al* 1911). Heather is useful as a cut plant, traditionally used for fuel, brushes/brooms, ropes, baskets, thatch and bedding (Gale and Cutler 2000, 61) and as a flavour for beer (Unger, 2004, 32) prior to the widespread adoption of hops. Bracken is a similarly useful plant, rich in potash, particularly in late summer, and used for fuel, thatching, compost, bedding, and as a source of yellow dye (Gale and Cutler 2000, 405).

Arable weeds

A limited range of arable weeds was present, some species occurring in relatively large numbers, particularly the medicks/trefoil type seeds (*Medicago/Trifolium* type), others represented by single seeds only. The majority of the species identified are typical of arable fields and disturbed habitats and would flourish on the light, free-draining loamy calcareous soils associated with the local chalk (Stace 1997). Species identified include probable field poppy (*Papaver* cf. *rhoeas*), corn gromwell (*Lithospermum arvense*), ivy-leaved speedwell (*Veronica hederifolia*) and scentless chamomile (*Tripleurospermum inodorum*). A small number of seeds of species more associated with slightly heavier soils include red bartsia (*Odontites vernus*) although seeds of this species cannot be distinguished from those of eyebright (*Euphrasia* spp). There is no evidence that cultivation of clay soils was particularly significant.

Seeds of grasses and grassland species may derive from the edges of arable plots, or from cut vegetation (or hay) or even dung. A single possible tuber of onion couch grass (*Arrhenatherum elatius*) was tentatively identified. The tubers are easy pulled with handfuls of grass stem and this species readily colonises arable fields (Salisbury 1961, 154) and is common in grass banks on field margins. Similarly black medick (*Medicago lupulina*) and several of the vetches are common colonizers of the grassy edges of arable fields on the Wiltshire Downs (personal observation).

A single sedge nutlet (*Carex* sp.) may indicate cultivation of wetter ground although this genus also includes species of drier conditions which may have occurred in downland habitats. Elder and several of the ruderal species, including the docks (*Rumex* spp), orache

(*Atriplex* spp) and plantains (*Plantago lanceolata/media* type) may have been growing within or around the settlement itself, although many of these plants also occur as arable weeds. Elderberries and their seeds may also have been burnt with firewood.

Sample composition and crop processing activities

The few items present in the majority of the samples potentially represent background scatters of material which may have been considerably re-worked. Conversely, in the five samples analysed from enclosure ditch 91083 cereal processing waste (chaff and weed seeds) was well represented, suggesting this had been used as fuel, presumably during burning activities in the immediate vicinity, and dumped in the ditch. Chaff was particularly common in the sample from ditch fill 91018, consisting of at least four times as many glume bases as wheat grain. This sample also produced 41coleoptiles (embryo sprouts) and a small amount of germinated grain. Given cereal chaff survives burning less well than grain (Boardman and Jones 1990) it can be assumed that chaff is actually under-represented in the samples, further supporting the interpretation that this assemblage represents cereal processing waste, which includes the occasional inevitable grain lost during processing. The presence of weed seeds of a range of sizes and including those from taxa which have large seed heads or form clusters, would suggest that removal of weeds prior to de-husking was limited, or that a mixture of the waste from both late and early crop processing stages is represented (Hillman 1981). A range of other waste material had been deposited in this feature including crop processing debris, burnt wild plants (heather, particularly in context 91019, and bracken) and large quantities of metal working debris (slag, hammer-scale; Phelps 2013, 135), pottery and small finds (iron pin, copper-alloy enamelled T-shaped brooch, copper-alloy bracelet fragment, probably toilet implement; Hembrey 2013, 118-22), indicating more than one episode of burning or waste disposal is represented.

The presence of glume bases, coleoptiles and occasional sprouted grain in context 91018 suggests the waste from a germinated crop is represented. Occasional sprouts were recovered from the other samples from the enclosure ditch. Grain may be germinated as part of the malting process, or may have sprouted during storage or even in the ear during wet harvests. While categorically separating deliberate germination for malting from accidental spontaneous sprouting is very difficult, the deposit is interpreted as likely to be the waste from malting. The deep grooves on the few sprouted grains are consistent with germination having taken place while the grain was still in its spikelet, while the uniform length of coleoptiles would suggest some degree of controlled germination.

The production of malt involves allowing cereal grain to germinate after it has been steeped in water, and then halting the germination process when the sprout is roughly two-thirds the length of the grain. This is normally done by roasting or drying the grain in a malting oven. The waste product consists of the chaff and sprouts (coleoptiles), and is referred to as the 'comings' or 'cumings' (Corran 1975, 11-2). The removal of the sprouts before brewing is regarded as necessary to avoid imparting a bitter flavour to the beer or

ale (Glamann 2005, 23). Chaff is particularly valuable as a fuel in the malting process as it does not adversely affect the taste of the malt, unlike some woods (Fenton 1978, 394), and there are a number of sites where remains of this type have been found (van der Veen 1989; Stevens 2006; Stevens 2011; Smith 2011; Pearson and Robinson 1994; Pelling 2011; Campbell 2008). The use of straw (particularly wheat) in preference to other forms of fuel in the malting process was suggested by Markham (1683), and by medieval inventories from Essex which suggest straw was the most common fuel used in malting (Crosby 2000, 41). The comings also provide a valuable animal feed so are not always burnt (Hillman 1981).

The scarcity of barley chaff in relation to wheat, despite the similar numbers of grain, is largely explained by the processing requirements and, potentially, the uses of the two cereals. Emmer and spelt grain is held within tightly adhering glumes (or hulls) and breaks into spikelets (pairs of grain and glumes) when threshed. If the cereal is stored in spikelet form then processing to remove the glumes is likely to take place within the settlement on either a piecemeal, regular basis as required, or in larger batches if more large-scale processing facilities are in place. Barley, conversely, is a free-threshing cereal in which the grain falls free of the rachis and therefore tends to be stored as processed grain, the chaff and many of the weed seeds not entering the site unless required for a specific purpose such as animal feed (Hillman 1981; 1984).

Comparison with the 'Winterbourne' settlement assemblage

Whilst still taking into account the limited area excavated at the 'Winterbourne' site to the north of the A4 and the small number of samples discussed by Scaife (1996a), there are some apparent differences between the two datasets either side of the Roman road (the modern A4 largely follows the line of the Roman road). Samples examined by Scaife tended to contain good evidence for crop processing waste in the form of chaff, but with very few weed seeds present compared to the enclosure ditch deposits, suggesting a greater level of processing prior to de-hulling. Somewhat greater numbers of cereal grain sized *Avena* and/or *Bromus* type caryposes were however recovered from the Winterbourne site samples. Such large seeded weeds may remain with the grain until the final stages of processing when they could have been removed by hand and discarded with the cereal chaff. No heather was found suggesting a more limited range of plant processing activities or burning/depositional events. Also distinctive was the presence of large numbers of highly fragmented cereal grain (it is not clear if the grain fragments show signs of being broken before or after charring).

The differences in the two assemblages are likely to be related to activities leading to the deposition of the material and the intended use of the cereals or use of cereal processing waste or by-product. The degree of weed removal prior to storage and/or de-husking has been linked to the availability of labour at harvest (Stevens 2003). It is also likely to be related to the intended use of the grain; if grain was intended for malt production and germinated while still in spikelet form (as opposed to fully processed clean grain) the

removal of weeds prior to malting would be unnecessary as they could be removed when separating the chaff and coleoptiles from the germinated grain after roasting. This would imply a decision about intended use of grain prior to storage and allocation of pre-storage processing labour depending on intended use. Alternatively the higher proportion of weeds in the enclosure ditch may simply reflect the greater range of sources of the burnt material. The fragmentation of the grain seen in the Winterbourne site samples may be related to burning conditions, such as burning of naked grains or a very dry heat. It should also be considered that fragmented grain may represent a stage of milling or even specific food preparation (Valamoti 2011). If spelt wheat is milled in spikelet form (possible if the spikelets are fully ripe and dry or parched) it is possible that the glumes were removed following milling by sieving the flour, removing large grain fragments simultaneously.

Concluding Remarks

The mixed nature of the deposits in the enclosure ditch, which includes metal working debris, pottery and small finds, as well as cereal chaff, weeds and wild resources such as heather, raises the possibility that the waste from multiple burning events is represented. The most likely source of charred plant remains on archaeological sites is fuel (Hillman 1981). The fuel used will be determined by the type of heat needed (short and fierce, prolonged, gentle) and function of the fire (bread ovens, malting ovens, pottery kiln, smelting furnaces). Burning (in ovens, furnaces or open fires) may have taken place locally although no obvious corn drier, furnace or similar were identified and the material represents the dumping of fuel and associated waste rather than *in situ* burning. Among the alternatives to chaff for fuel in malting ovens Markham suggests that bracken, ling, heather or broom 'may serve in time of necessity but all add bad taste to malt' (1683, chapter 7). The presence of heather in the same feature as possible malting waste is then of interest, as it may also have been used as fuel. Heather was also occasionally used amongst other herbs in the manufacture of gruit (or grut), widely used to flavour beer prior to the introduction of hops (Unger 2004, 32).

While the combined assemblage of charred plant remains from both north and south of the A4 at the Later Silbury Romano-British site is modest it has provided some intriguing insights into the plant economy of the settlement and activity areas. Most strikingly perhaps is the absence of any plant remains suggestive of status, or ritual activity involving plants. This is not to imply that such activity never took place, but essentially the assemblage recovered is typical of a Romano-British settlement in which spelt wheat and barley were processed in modest quantities, presumably for day to day use rather than significant storage. All the cereals and weeds could derive from local fields, while heather and bracken are likely to have been collected from areas of clay-with-flints in the wider vicinity. Cereal processing waste was presumably locally generated, although it is possible that it was brought into the site to feed animals or for fuel use. The residents may have been producing beer, possibly for local consumption, but also potentially to cater for travellers on route to Bath. Deposits consisting largely of malting waste have been recovered from a number of Roman period roadside sites; particularly notable

assemblages have recently been identified from Springhead roadside settlement and sanctuary and Northfleet villa in Kent (Stevens 2011; Smith 2011). Stevens *et al* (2011, 241-3) suggest a link between brewing activities and major Roman roadsides, many being situated at junctions of major roads, where beer might be produced to serve military personnel, pilgrims and other travellers.

Excavation of the Romano-British settlement at Silbury has focused on a fraction of the settlement. The intensive nature of the sampling programme has ensured that a useful dataset of charred plant remains has been recovered which has demonstrated the presence of distinct loci of refuse disposal, if not industrial and brewing activity. Importantly, by examining samples from all features excavated, differences between features have been identified, despite the obvious problems of recent contamination and potential disturbance by arable activity. In their discussion of archaeobotany of Roman Britain, van der Veen *et al* (2007, 203) identify the need for larger datasets consisting of samples from all closely-dated contexts and focusing on sites where large-scale sampling is to be carried out. Despite the small database generated, the samples from the 2010 excavation at Romano-British Silbury demonstrate the potential of the site.

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Table 1: The charred archaeobotanical remains from deposits in Enclosure Ditch 91083

	Sample	51001	51004	51005	51030	51008
	Context	91005	91010	91004	91019	91018
	Feature	91006/91083				91013/91083
	Sample volume (l)	40	40	40	70	35
	Flot volume (ml)	500	300	400	700	400
	Phase	4b	4a	4b	4a	4b
	Date	?C3	C2+	C4	C2	late C2-C3
Cereal Grain	Contamination	unlikely	unlikely	unlikely	unlikely	Probably
Triticum cf. *spelta* L.	cf. Spelt wheat grain	3	-	-	-	-
T. spelta/dicoccum	Spelt/emmer wheat grain	1	1	1	1	4 [4]
T. spelta/dicoccum[1]	Spelt/emmer wheat germinated grain	2	1	5	6	9
Triticum sp. [2]	Wheat grain	29	6	13	15	16
Triticum sp.	Wheat, short rounded grain	*	-	-	-	1
Triticum sp.	Wheat, germinated grain	-	2	-	-	-
Triticum sp.	Wheat grain within organic matrix	-	-	-	1+	-
Hordeum vulgare sl [3]	Barley, hulled grain	1	1	2	9	8
H. vulgare sl	Barley grain	19	2	8	29	4
Secale/Triticum sp.	Rye/Wheat grain	1	-	-	-	-
Cerealia indet	Indeterminate cereal sized caryopses	89	11	19	76	67
Cerealia indet	Indeterminate cereal, dorsal ends	-	5	-	-	-
Cereal Chaff						
Triticum spelta L.	Spelt wheat, spikelet fork	1	-	-	-	1
T. spelta L.	Spelt wheat, glume base	18	1	55	17	141
T. cf. *dicoccum* Schübl.	cf Emmer wheat glume base	-	-	-	1	-

		Sample	51001	51004	51005	51030	51008
		Context	91005	91010	91004	91019	91018
T. spelta/dicoccum	Spelt/emmer wheat spikelet fork		12	-	2	5	7
Triticum spelta/dicoccum	Spelt/emmer wheat glume base		38	12	88	28	253
T. spelta/dicoccum	Spelt/emmer rachis segment/spikelet base		-	-	-	3	9
Triticum sp.	Hexaploid wheat rachis internode		1	-	2	1	-
Triticum sp.	Wheat rachis, probably free-threshing		-	-	1	-	-
Hordeum vulgare sl	Barley rachis segment		1	1	1	1	1
Cerealia indet	Coleoptile (sprouted embryo)		3	1	6	2	41
Cerealia indet	Detached embryo		-	-	-	-	1
Weed/Wild							
Pteridium aquilinum (L.) Kuhn	Bracken frond		-	-	-	1	-
Ranunculus acris/repens/bulbosus	Buttercup		-	1	-	-	1
Papaver cf. *rhoeas* L.	Field poppy		-	-	-	-	2
Corylus avellana L.	Hazel nut shell frag		-	-	1	-	-
Chenopodium album L.	Fat Hen		1	-	2	-	-
Chenopodiaceae indet	Goosefoot family		3	1	-	3	-
Atriplex sp.	Orache		38	2	-	10	9
Stellaria media agg	Chickweed		-	-	1	-	-
Polygonaceae indet	Knotweed family		1	-	1	1	-
Polygonum aviculare L.	Knotgrass		-	-	-	1	-
Fallopia convolvulus (L.) Á. Löve	Black bindweed		1	-	-	3	3
cf *Persicaria* sp.	Knotweeds		-	-	1	-	-
Rumex sp.	Docks		4	-	1	4	11
Ericaceae indet	Heather/ling leaf tips		-	-	-	4	-
Calluna vulgaris (L.) Hull	Heather, seed caps		6	-	-	192	3

		Sample	51001	51004	51005	51030	51008
		Context	91005	91010	91004	91019	91018
C. vulgaris (L.) Hull	Heater leaf tip/shoot		-	-	-	1	-
Vicia/Lathyrus sp.	Vetch/vetchling, small seeded		9	-	2	6	3
Medicago lupulina L.	Black medick		1	-	-	-	3
Medicago/Trifolium/Lotus type	Medick/clover/trefoil etc		29	2	7	25	47
Apiaceae indet.	Daisy family, indeterminate, large seeded		-	-	-	-	1
Lamiaceae indet	Dead-nettle family		-	-	-	1	-
Lithospermum arvense L.	Corn Gromwell		-	-	-	-	1
Plantago lanceolata/media	Plantain		-	-	-	1	3
cf. *Plantago lanceolata/media*	Plantain		1	-	-	1	-
Veronica hederifolia L.	Ivy-leaved speedwell		1	-	-	-	-
Galium aparine L.	Goosegrass/cleavers		13	3	2	6	8
Sambucus nigra L.	Elder		-	-	-	1	-
cf *S. nigra* L.	cf Elder		-	-	-	-	1
Odontites vernus/Euphrasia sp.	Red bartsia/eyebright		1	-	-	-	8
Asteraceae	Daisy family, indeterminate small seeded		-	-	-	-	1
Tripleurospermum inodorum (L) Sch. Bip	Scentless chamomile		3	-	1	-	5
Poaceae indet.	Grass, large seeded		2	-	-	2	1
Poaceae indet	Grass, small seeded		1	-	2	7	7
Poaceae indet	Grass, intermediate sized		2	-	-	-	1
Avena/ Lolium sp.	Oats/rye grass		-	-	1	-	-
Avena sp.	Oats, grain		1	-	4	-	1
Avena sp.	Oats, awn fragment		1	-	-	1	-
Phleum/Poa annua type	Cat's tail/meadow grass		1	5	-	3	8
Bromus sp.	Brome grass		1	1	-	-	-
cf. *Arrhenatherum elatius* var *bulbosum* (Willd) St-Amans	Onion couch grass, tuber fragment		-	-	-	-	1

		Sample	51001	51004	51005	51030	51008
		Context	91005	91010	91004	91019	91018
Carex sp.	Sedges		-	-	-	-	1
Indeterminate			14	3	2	7	12
Indet	Mineralised seed, small		-	-	3	3	4
Indet	Charred leaf fragment		-	1	-	-	-
Unidentified twig wood (prob *Calluna*)			-	-	-	++	-
unaltered - recent or waterlogged/mineralised							
Large fly pupae case			-	-	-	++	-
Ficus carica L.	Fig		-	-	-	-	1
Actinidia deliciosa (A Chev) CF Liang & A R Ferguson	Kiwi fruit		1	-	-	-	-
Recent weeds – *Atriplex* sp., *Fumaria* sp., etc			-	-	-	++	-

[1] often lack signs of 'hulls' but do have typical profile with flat ventral surfaces

[2] Generally less well preserved or more rounded ventral surface than above

[3] some twisted but preservation poor so not assigned 'asymmetrical or straight'

[4] one of these is spelta shaped but has wrinkled dermis consistent with de-husking prior to charring

Table 2: Flots containing quantifiable plant remains: assessment data (excluding fully sorted samples)

Sample	Context	Feature	Description	Vol (l)	Flot vol (nl)	%roots	Grain	Chaff	Weeds	'Other'	Charcoal 4/2mm (ml)	Molluscs	Comments
5004	97015		alluvial deposits	40	50	30	1	-	-	-	-	+++	*Triticum*, short gained x1
51002	91009	91008	pit fill	40	300	40	-	5	-	-	-/1	+++	*T. spelta* glume x4; *T. spelta/dicoccum* x1; Recent straw, fly pupae
51003	91012	91033	pit/well fill	40	400	40	1	-	-	-	-/<1	++	Indet grain x1. Recent chaff/weeds. Coal
51006	91016		linear feature	32	400	50	6	2	-	-	2/1	++	*Hordeum* grain x2; *T. spelta* grain x2; Indet grain x2, *T. spelta* glume x2. Occ recent chaff/weeds
51007	91017	91006	ditch fill	20	100	50	7	-	-	1	<1/<1	++	*T.spelta* germinated grain x2; *Hordeum* x3, indet gain x2. Indet pulse (*Vicia/Pisum*) x1
51010	91037	91008	large pit/well	38	50	10	1	-	1	-	1/2	+++	*Hordeum* grain x1; *Trifolium* type x1. Recent fly pupae/straw/chaff. Small mammal (rodent type?) bone.
51012	91038	91008	pit fill	34	250	40	3	1	-	-	-/-	-	*Hordeum* grain x1; *T. spelta* x 1; *Triticum* x1; *T. spelta* glume x1
51013	91035	91013	Ditch fill	38	500	-	6	-	-	1	2/2	++	*Hordeum* grain x2; Indet x2; *Avena* x1; recent straw/chaff/weeds
51009	91034		Posthole	5	120	10	2	10	5	-	-/-	+	*T. spelta* grain x1 (1 germinated); *T. spelta* + *T. spelta/dicoccum*. chaff; Weeds: *Galium*, *Rumex*,

													Trifolium type, *Odontites*
51015	91041	91039	primary ditch fill	20	150	30	1	-	-	-	-/-	++	*T.spelta* grain x1; Recent centipede/weeds
51025	91038	91008	pit/well fill	40	250	50	6	-	-	-	1/1	++	*T.spelta* grainx2; *Hordeum* x2; *Triticum* x1; Indet x1; Mammal bone, ?amphibian bone.
52001	92004	92003	Ditch fill	40	170	40	2	-	-	-	-	++++	*Hordeum* grainx2; Recent chaff, weeds, worm capsules
52002	92009	92003	Ditch fill	32	300	20	1	-	-	-	<1/<1	+++	Indet grain x1; Recent chaff, weeds.
52003	92006	92005	Ditch fill	40	200	30	1	1	1	-	-/-	++++	Indet grainx1; *T.spelta/dicoccum* glumex1; *Avena* x1. Recent chaff/weeds
52004	92010	92005	Ditch fill	40	300	30	3	1	-	1	/-<1	++++	*Triticum* grainx1; Indet grainx1; *T. spelta/dicoccum* glume x1; Poaceae small x1
52005	92011	92005	Ditch fill	36	250	20	1	-	-	-	-/<1	++++	Indet grain x1. Recent chaff/straw/weeds/fly pupae
52006	92013	92005	Ditch fill	18	175	10	14	2	-	2	1/1	++++	Grain: *Hordeum*, *T. spelta*, *Triticum*, Chaff: *T.spelta/dicoccum* glumes. Weeds: *Bromus* x2.
53001	93005	93008	Ditch fill	40	150	60	2	4	-	-	<1/<1	+++	*Triticum* sp. grain x2; *T. spelta* glume 2; *T. spelta/dicoccum* glume x2. Recent weeds
53002	93006	93008	Ditch fill	40	600	30	-	2	-	-	<1/<1	+++	Sprouted embryo x1; *T. spelta/dicoccum* glume x1.

													Recent chaff.
53003	93007	93008	Ditch fill	40	150	10	-	2	-	-	-/<1	+++	*T. spelta* glume x1; *T. spelta/dicoccum* glume x1; recent chaff
54001	94003	94005	Ditch fill	30	300	30	5	-	-	-	-/-	+	*T.spelta* grain x 2; *Triticum* x2; *Hordeum* x1. Recent chaff. Coal. Charcoal flecks
55001	95006	95004	ditch fill	39	300	20	3	-	-	-	-/-	+++	*T. spelta/dicoccum* grain x2; Indet x1; Recent straw/chaff/weeds
55002	95007	95005	ditch return	36	300	20	3	-	-	-	<1/<1	+++	*Hordeum* grain x2; indet x 1; frequent recent chaff/straw. Some weeds/worm capsules.
55003	95015		natural	6	50	50	1	-	-	-	-/-	++	*T. spelta* grain x1; recent chaff/straw

+=- <6; ++ = 6-25; +++ = 26-100; ++++ = >100; where numbers are given they represent actual counts of grain, chaff etc

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