Willington, Derbyshire (1998-46): Charred Plant Remains

Angela Monckton 12-26th Feb. 2007

Introduction

Archaeological investigations of this area of prehistoric activity in the floodplain of the River Trent were carried out by ULAS directed by Matthew Beamish in 1998-99. During excavations samples were taken for the recovery of charred plant remains which can give evidence of food, agriculture or activities in the past. A further objective of sampling was the recovery of charcoal for radiocarbon dating, and for identification to show the type of wood used and to provide information about the environment. The features sampled were of Neolithic to Bronze Age date and included a burnt mound with associated hearth and pits, numerous burnt features including hearths and treethrows, and contexts associated with a round barrow. Later stages of the excavation revealed a second burnt mound of Bronze Age date and an associated waterlogged palaeochannel, other features also included hearths and treethrows. The samples were analysed recently in order to date the features, and contribute to the investigation of life in the past.

Recovery of charred material was considered a priority because the site was well sealed below alluvium and plant remains of this period are rare nationally. It was hoped that such remains would contribute to the growing information from this landscape and add to that from the region and locality including Potlock Cursus, Aston-on-Trent Cursus, and from excavations carried out by Gwilym Hughes nearby in Willington as charred plant remains were recovered from all these sites (Moffett and Monckton 1996, Alvey 1964, G. Hughes pers. comm.).

Additional samples were taken from a number of the waterlogged palaeochannels and peat layers by specialists James Greig of Birmingham University for pollen and plant macrofossils, and Mark Robinson of Oxford University for insect remains with the objective of recovering evidence of the environment of the site during the phases of use. Additional waterlogged samples were taken by ULAS staff. The waterlogged samples were analysed by James Greig and David Smith below.

Methods

Features were sampled if they were datable and had the potential to contain charred plant remains or charcoal. Samples from the first part of the project were processed and assessed in 1999 and samples from the second part of the project were processed in 2005-6, all are recorded on the site database. A total of 180 samples of prehistoric date were processed amounting to 992 litres of soil. These included some small samples mainly from discrete burnt areas taken for the recovery of charcoal for radiocarbon dating which were also examined for the presence of charred plant remains. Small sub-samples were reserved from each sample.

Samples were wet-sieved in a York tank using a 1mm mesh with flotation into a 0.5mm mesh sieve in 1999, and using 0.5mm mesh and 0.3mm sieve in 2005. The residues were air dried and the coarse fraction (over 4mm) sorted for all finds which are included in the relevant sections of this report. The stones from the burnt mounds were graded by size and recorded in order to examine the composition of the burnt mound. The fine fraction of the residue (below 4mm) was reserved for sorting during analysis. The flotation fraction (flot) was air dried and packed carefully in self-seal polythene bags and submitted for analysis.

The flots were sorted using a x10-30 stereo microscope and the plant remains were removed to glass specimen tubes stored with the flot. The plant remains were identified by comparison with modern reference material. Because of the scarcity of remains any charred fragments which were possibly of plant remains were removed and recorded on the database. The remains were noted and counted then tabulated by group below (table 1), the plant names both common and botanical follow Stace (1991). Plant remains found in the coarse fraction over 4mm were also included on the table. Selected fine fraction residues below 4mm were also sorted for plant remains not recovered by flotation from samples with any fruitstones or nutshell in the coarse fraction or flot, samples with any suspected cereal grain fragments,

samples with charred seeds, and those dated by radiocarbon. These were recorded as FF remains on the database. Charcoal was weighed and recorded from all fractions.

Recovery of charred plant remains

Plant remains, particularly cereals, were scarce on the site so the limitations of the sampling and processing methods particularly sample size, type of sediment and recovery of remains was considered. The samples were generally of smaller volume than is desirable for prehistoric contexts where concentration of remains is likely to be low. This was partly because well located small concentrations of burnt material were sampled for radiocarbon dating, and partly because the difficulty of processing the clay. To offset this problem as many samples as possible were examined. The clay was difficult to disperse in the tank so a 1mm mesh was used in 1999 and processing may have fragmented cereal or seed remains. However, cereal fragments are distinctive and no fragments were positively identified although some seeds and seed fragments were found. Samples were soaked in water and sieved on finer meshes in 2005 but no more cereals were found. Recovery by flotation of nutshell and fruitstone fragments was poor and most of these were found in the residues, some charcoal also remained in the residues because some of it was impregnated with mineral deposits. Sorting of a third of the fine residues produced some additional remains in only a few samples. Although recovery and preservation may have affected the quantity of remains found it is thought that the samples reflect the sparsity of charred plant remains on the site because large quantities of charcoal were recovered, and the smaller well located deposits proved their value in radiocarbon dating.

Results, the plant remains

The charred plant remains recovered were mainly charred hazel nut shell (*Corylus avellana*) and fruitstones of sloe (*Prunus spinosa*) with ocasional hawthorn pips (*Crataegus* sp). These plant remains probably represent gathered food and suggest nearby wood margin or scrub vegetation. Only occasional cereal grains were found, one indeterminate grain was from a sample with nutshell, sloe stones and charcoal also present group 803 sample 57, and one other context of the fire clearance group 813 sample 61 which was undated. Close examination of charred fragments and concretions suspected to be possible cereal grains, showed that these were not of cereals.

A few single charred seeds were recovered of wild plants including grasses (Poaceae), sedge (*Carex* sp), clover type (*Trifolium* type), vetch type (*Vicia/Lathyrus*), fat-hen (*Chenopodium album*), thistle (*Carduus/Cirsium*), knotweed (*Polygonum* sp), cornsalad (*Valerianella* sp) and scentless mayweed (*Tripleurospermum inodorum*). Charred seeds were most numerous in Burnt Mound 2 which included cone fragments of alder (*Alnus glutinosa*) with seeds still attached. These deposits also contained numerous waterlogged seeds particularly of water plants, but included fruit pips of hawthorn, bramble (*Rubus fruticosus* agg.) and elder (*Sambucus niger*) which were available as foods, although it is not possible to prove that these were here as food remains. The charred seeds included buttercups (*Ranunculus acris, repens* or *bulbosus*), sedges (*Carex* spp.), spike-rush (*Eleocharis* sp.), bedstraw (*Galium* sp.), and grasses. Waterlogged seeds included some of the same plants found in the samples analysed by James Greig (this volume). The seeds found probably represent the plants growing on and around the site and suggest grassy vegetation, disturbed ground and scrub or woodland margin in the vicinity, with water plants and water-side vegetation nearby.

Plant remains from Groups

From the total of 180 samples from 41 spatial groups only 34 samples from 18 groups contained charred plant remains other than charcoal. Of these nine groups contained charred fruit or nut remains while the rest contained occasional charred seeds, possible single cereal grains were found in only two samples.

The features which contained the most charred remains, mainly of hazel nutshell and sloe stones were from G803, G805, G806, G2503, G2504, G2529, G2543, G2550 burnt mound 1, and G4563 burnt mound

2. Most remains were found in G803 Neolithic pits, and G2550 pit or trough of burnt mound 1. A few charred seeds were found in other groups described below.

Earlier Neolithic

Two groups produced samples with both sloe stones and hazel nutshell; Groups 803, and 806. These were from two Neolithic pits of G803 pit 458 sample 57 which contained 17 nutshell fragments and six sloe stones and a possible cereal grain of indeterminate type, and pit 480 with 48 nutshell fragments and a grass seed. Group 806 sample 42 of hearth 362 contained a single sloe stone and nutshell fragment. Group 805 sample 2 surface 0057 contained two sloe stones and a hawthorn pip. There was nutshell alone in Group 2503 sample 65 from posthole 1447, and Group 2504 sample 68 of cooking pit 1485..

Single charred seeds were found in 12 contexts with no other plant remains (table 1). These were from hearth (G806, 340), burnt material (G807, 338, 352), fired features (G2509, 1428), (G2516, 3070), (G2519, 3058), (G2543, 134), gully (G2512, 1449, 1557), pits (1429), (G4502, 444) and cut feature context (G2520, 1215). Most of these contexts were in Neolithic features, except the last which was undated. Charred seeds included grasses, clover and vetch type, thistle, cornsalad, scentless mayweed and fat-hen, they are all plants of grassy vegetation. The seeds found probably represent the vegetation of parts of the site with seeds incidentally included where burning was carried out in hearths or tree throws.

Beaker Period

A sample from Group 2529 contained three sloe stones in sample 119 posthole 1833.
A sample from Group 2543 contained two sloe stones in sample 6 surface burning context 78, of the clearance phase.

Burnt Mound 1, BC 2200-1900

Charred plant remains were found in the features rather than in the burnt spread of Group 2550. The pit (trough) 1483 contained nutshell alone in samples 79 and 81, one and seven fragments respectively. Sample 80 contained two sloe and two nutshell fragments, sample 92 contained three sloe stones and six nutshell fragments. A few charred grass seeds were the only other charred seeds recovered. Hearth 1704 sample 91 contained a couple of sloe stone fragments. Abundant charcoal was recovered from all the samples from this group. These contexts all date to BC 2200-1900 as no charred plant remains were recovered from the earlier Neolithic spread below the mound.

Burnt Mound 2, Bronze Age

In Burnt Mound 2, Group 4563, as in Burnt Mound 1 all the remains recovered were from the features not the burnt spread. The trough 4562 sample 273 contained the most charred seeds with fragments of alder cone present with seeds still attached, together with 18 charred seeds of buttercup, sedges, vetch type and bedstraw together with a few waterlogged seeds, mostly of the same plants with some uncharred stem and root fragments. There was also a single charred hazel nutshell fragment in this sample. The only other food remains from this group were from sample 314 which contained a charred sloe stone with 12 charred seeds including spike-rush, sedges and bedstraw. There was also a charred alder catkin fragment, and a few waterlogged seeds including buttercup and club-rush. The hearth 4477 sample 272 contained a possible fruit stone fragment.

Samples from the Gully G.4562 contained alder cone fragments with seeds in sample 308, a charred buttercup seed in sample 305 both with more waterlogged seeds including water-plants which were most numerous in sample 306. The latter also contained charcoal and compared with the palaeochannel sample 284 of previous Group 4563 which was very rich in seeds of water and waterside plants.

Table 1: Total numbers of samples in each Group with total volume processed, and number of samples with remains present (total fragments found in brackets).

Group	Samples Total	Volume Litres	Seeds Uncharred	Seeds charred	Hazel Nutshell	Sloe stone	Other and details
801	2	12	1	-	-	-	-
802	3	7.8	1	-	-	-	-
803	13	49.1	2	4(2+2?)	3 (65)	1 (6)	?cereal, knotgrass
805	3	16.5	2	1 (1?)	-	1 (3)	Hawthorn (1)
806	5	18	2	1 (1)	1 (1)	1 (1)	A grass seed
807	4	28	-	2 (2)	-	-	Clover type seeds
813	2	8.5	-	1 (2)	-	-	?barley, grass seed
814	2	5.7	-	-	-	-	-
2500	3	21	1	-	-	-	-
2503	7	51.5	-	-	1 (3)	-	-
2504	3	14	1	-	1 (2)	-	-
2505	10	52.5	2	2 (2)	-	-	Grass seed
2508	2	12.5	-	-	-	-	-
2509	2	13	-	1 (1)	-	-	Scentless mayweed
2510	1	2	-	-	-	-	-
2511	1	4.5	-	-	-	-	-
2512	4	29	1	2(2+1?)	-	-	Grass, thistle seed
2514	2	11	-	-	-	-	-
2516	8	52.5	1	2 (2)	-	-	Hawthorn (1), clover type
2519	4	25	1	1 (1)	-	-	Grass seed
2520	3	12.5	-	1 (1)	-	-	Sedge seed
2522	1	1.5	-	-	-	-	-
2523	1	7	-	-	-	-	-
2526	1	6	1	1 (1?)	-	-	-
2527	3	15	-	-	-	-	-
2529	1	0.5	-	-	-	1 (3)	-
2530	4	11.5	1	-	-	-	-
2532	2	9	-	-	-	-	-
2536	1	2	-	-	-	-	-
2539	5	13	-	1 (1?)	-	-	-
2541	1	7	-	-	-	-	-
2543	5	31	2	2(2+1?)	-	1 (2)	Cornsalad, vetch
2550	29	205.5	6	3 (3?)	4 (16)	3 (7)	Seeds frags only
3100	3	24.5	-	-	-	-	-
4500	1	3.5	-	-	-	-	-
4502	2	8	-	1 (1)	-	-	Fat-hen seed
4504	3	19	1	-	-	-	-
4505	1	7	1	-	-	-	-
4550	1	7.5	-	-	-	-	-
4551	4	31.5	-	1 (1?)	-	-	A tuber (1)
4561	9	64	2	-	-	-	-
4562	3	15	3	1 (2) +W/L	-	-	Alder cone, buttercup, grass
4563	10	43	9	4 (30) +W/L	1 (1)	1 (2)	Alder cone + seeds in 274 and 314.
4564	1	0.5	1	-/ +W/L	-	-	-
4567	1	6	1	-	-	-	-
Totals	180	992.5	-	26(52)	11(88)	9(24)	

Discussion

The remains found are mainly of the gathered foods hazel nuts and sloes. These were found in 18 samples compared with cereal grains which were only possibly present in 2 samples in much smaller amounts, with none from the burnt mounds. This would appear to indicate a reliance on gathered rather than cultivated food although nutshell and fruitstones are food waste while burnt grains represent a loss of food which may have been avoided. The lack of any even low concentration scatter of grains and grain fragments is noteworthy. However negative evidence is difficult to prove so these results should be treated with caution. The site is very much less productive than Yarnton in the Thames Valley where 2728 nutshell fragments and 201 cereal grains were found in 7 tonnes of samples (over 400 items per tonne). Here 170 items of plant remains including charred seeds was found from just over one tonne of samples. Yarnton was not thought on the evidence to be a fully agricultural economy (Robinson 2000), here there is little sign of agriculture.

Other burnt mound sites in the region have produced mainly wild food remains as at this site. Samples from the Late Neolithic burnt mound at Watermead Park contained only sparse amounts of sloe and hazel nutshell remains, while at the Middle Bronze Age burnt mound at Willow Farm Castle Donington samples also contained sloe stones and hazel nutshell with very sparse evidence of cereals including the chaff of glume wheat. More samples were examined at Willow Farm than at Watermead Park but all remains were still sparse. However, Neolithic cereals are known from the region, particularly Lismore Fields Buxton dated from 3990-3150 cal BC (Jones 2000). Others, summarized in Monckton 2006, include Neolithic cereals from the Trent Valley from Aston Cursus where abundant emmer grain was dated to around 3500 cal BC (Loveday 2000 CA 167,438-9, Reaney 1968), cereals including barley together with numerous charred seeds are known from the cursus ditch at Potlock (Monckton and Moffett 1996). An isolated pit dated to around 2000 BC at Castle Donington contained cereal grains and nutshell with numerous charred crab apples (Monckton 2004). Cereals of Bronze Age date are known from pits near a barrow at Lockington and include emmer and spelt (Monckton 2000). Spelt is also known from a Late Bronze Age settlement at Eye Kettleby (Monckton forthcoming) and barley at Ridlington Rutland (Beamish 2005) from a house ditch. Hence cereals were present in the region during the period of use of the burnt mounds at Willington, but cereals and plant remains in general are sparse on the burnt mound sites. Although cereals have been established as a usual part of the Neolithic economy they are not found on all sites and it is likely that different parts of the landscape were exploited in different ways as they are today. Hence cereals are much less likely to be present in wetland habitats.

The river valleys provide not only communications by water and land but the floodplains are rich in resources. Animal resources include food from hunting wild birds and water-fowl, fish and eels, animals which use the streams for water, and when cleared seasonal pasture on meadows and water-meadows are a valuable resource, and possibly animal products, such as meat and hides, even feathers, may be processed at the end of the season. Plants available for foods include fruits and nuts from scrub or woodland margins, either natural or man-made clearings, and perhaps later from hedgerows used to divide the land. Young leaves of nettle, hawthorn and fat-hen are know to be edible and these would have been available. In addition water plants can provide food as some sedge seeds, waterlily seeds, and reedmace rhizomes are edible with sufficient processing as shown by Ray Mears and Gordon Hillman recently (BBC2, 2007). Other plant products such as reeds and fibres would also have been used. Unfortunately, although these plants were present on the site there is little evidence of their use except for the disposal of nutshell and fruitstones in fires, as food waste from probably temporary occupation. The presence of many fire-cracked pebbles and charcoal suggests that pebbles were heated in hearths and used to heat water in troughs cut into the ground but there is no evidence that this was used to process food.

There are several main episodes of use of the site seen from the plant remains. The Neolithic pits of Group 803 and other earlier features have hazel nutshell and sloe stones with charcoal in pits, probably as food waste during temporary camps made perhaps to gather food and hunt in the floodplain. Clearing the ground of trees began with similar evidence throughout. The presence of nutshell and fruit stones suggests occupation in late summer and early autumn, the charred seeds also suggest summer occupation. Burnt Mound 1 has the same type of food waste and also suggests use at this time, perhaps at the end of seasonal occupation for the summer because of flooding of the wetland in the winter. Burnt Mound 2 has only

single fragments of nutshell and fruit stones but also contains charred cone fragments of alder with seeds still attached. Alder flowers and is pollinated in February and March and then sets seed which is released in the summer, after which the cones become woody before the leaves fall for winter. Hence it is likely that this may date from early to mid summer. The seeds found here also include buttercups which flower and set seed in early summer. This mound has evidence of meadow and pasture from associated waterlogged deposits in the nearby palaeochannel (see Greig this volume), and this may suggest use during the period of summer pasturing of animals on the floodplain.

Conclusions

The samples taken for the recovery of plant remains show the types of feature containing plant remains are mainly those positively identified as pits, hearths, postholes, and features associated with the burnt mound. The most abundant remains were from two Neolithic pits of G.803 one dated to BC 3600-3300, burnt mound 1 features of G.2550 dated to BC 2200-1900, and Bronze Age burnt mound 2 features dated to 1400-1000. The plants found give some indications of the surrounding environment but investigation of the waterlogged samples provide more evidence of this (Greig, Smith, this volume). There was only positive evidence for the use of wild plant foods as hazel nuts and sloes suggesting temporary occupation during the summer to early autumn from Early Neolithic pits and Burnt Mound 1. There was a scatter of similar evidence from the clearance features. Burnt Mound 2 was suggested to have activity earlier in the summer from the evidence of alder cones. Other available resources of the floodplain were discussed.

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