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**Assessment of plant and invertebrate
macrofossils from deposits at a site at Catesby
Business Park, Balby Carr, near Doncaster,
South Yorkshire (site code: BCA04)**

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**Assessment of plant and invertebrate macrofossils from deposits at a site at
Catesby Business Park, Balby Carr, near Doncaster, South Yorkshire
(site code: BCA04)**

by

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Summary

Ten sediment samples recovered from deposits encountered during excavations at Catesby Business Park, Balby Carr, near Doncaster, South Yorkshire, were submitted for an assessment of their content of plant and invertebrate macrofossils (brief records were made of other classes of biological remains where present). The site consisted of ring ditch and trackway (with associated ditches) features of probable Iron Age date. A hearth feature was located more or less centrally within the main ring ditch. It is possible that these features define a settlement enclosure, but the site is very low lying and damp and, as such, not an ideal location for habitation. An alternative interpretation would be as an industrial site.

Plant remains preserved by anoxic waterlogging were present in quantity in many samples, especially the fills of trackway ditch 207, and preservation was often very good. Preservation of insects was quite variable within and between deposits, much of the decay probably occurring during deposit formation. In the series of fills from ditch 207 the plant and insect remains indicated deposition in a body of water, probably heavily shaded at most stages, in an area of swamp dominated by alder carr. It probably represents a period of abandonment, or at least neglect, following human occupation. The other samples included some assemblages more likely to have formed through deposition close to an area of human activity. Overall, the remains gave no strong indications either way in favour of the site being a settlement or industrial area.

Evidence for human occupation was extremely limited and processing of larger samples to extract, for example, charred remains of plants of economic value does not appear to be promising, though the material should be re-examined to check for the presence of wood fragments resulting from woodworking or felling. The insect remains could provide a useful reconstruction of ecology within and around the trackway ditch 207. Providing dating can be made reasonably close, it is suggested that the insects from this feature are analysed in detail, and the evidence combined with that already obtained from plant macrofossils.

KEYWORDS: CATESBY BUSINESS PARK; BALBY CARR (NR DONCASTER); SOUTH YORKSHIRE; ASSESSMENT; IRON AGE; PLANT REMAINS; CHARRED PLANT REMAINS; INVERTEBRATE REMAINS; BEETLES; VERTEBRATE REMAINS; ?WOODWORKING

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Assessment of plant and invertebrate macrofossils from deposits at a site at Catesby Business Park, Balby Carr, near Doncaster, South Yorkshire (site code: BCA04)

Introduction

An archaeological excavation was carried out by Archaeological Services WYAS (ASWYAS), at Catesby Business Park, Balby Carr, near Doncaster, South Yorkshire (centred on NGR SE 584 005), during 2004.

The site consisted of ring ditch and trackway (with associated ditches) features of probable Iron Age date (sherds of late Iron Age pot were recovered). A hearth feature was located more or less centrally within the main ring ditch. It is possible that these features define a settlement enclosure, but the site is very low lying and damp and, as such, not an ideal location for habitation. An alternative interpretation would be as an industrial site.

Ten bulk sediment samples ('GBA'/'BS' *sensu* Dobney *et al.* 1992) were submitted to Palaeoecology Research Services Limited (PRS), County Durham, for an assessment of their content of plant and invertebrate macrofossils.

Methods

The subsamples were inspected and their lithologies were recorded, using a standard *pro forma*, prior to processing. For all ten samples, a subsample was processed broadly following the techniques of Kenward *et al.* (1980; 1986). Prior to processing the subsamples were disaggregated in water for 24 hours or more and their volumes recorded in a waterlogged state.

The flots and washovers resulting from processing were examined for plant and invertebrate macrofossils. The residues were examined for larger plant macrofossils and

other biological and artefactual remains. Where the residues included a significant component of waterlogged plant remains, they were examined wet. When primarily mineral in nature the residues were dried, weighed and their components recorded. The flots were stored in alcohol.

Plant remains in the flots, washovers and residues, and the general nature of these various fractions, were recorded briefly by 'scanning', identifiable taxa and other components being listed directly to a PC using *Access* software.

Insects in the flots were recorded using 'assessment recording' *sensu* Kenward (1992), creating a list of the taxa observed during rapid inspection of the flot, with a semi-quantitative estimate of abundance, and a subjective record of the main ecological (e.g. aquatics, grain pests) or indicator/activity (e.g. for stable manure, Kenward and Hall 1997) groups present. A record of the preservational condition of the remains was made using scales given by Kenward and Large (1998). This scheme provides scales for chemical erosion and fragmentation (0.5-5.5, the higher figure representing the greatest degree of damage), and colour change (0-4), in each case giving a range and a value for the position and strength of the mode (Kenward and Large 1998, tables 2, 3 and 5-7).

Brief records have been made of other classes of biological remains where present.

Results

The samples from the large trackway ditch (207) are listed first, in stratigraphic order, lowermost first, followed by the remaining samples in context number order.

Archaeological information, provided by the excavator, is given in square brackets. A brief summary of the processing method and an estimate of the remaining volume of unprocessed sediment follows (in round brackets) after the sample number.

Context 223 [Basal fill of trackway ditch 207]

Sample 10/T (3 kg/2.3 litres sieved to 300 microns with washover; approximately 5 litres of unprocessed sediment remain)

Moist, light grey and light brown (also mid orange in places from rotted wood), sticky (working soft and sticky), slightly sandy, clay silt (to silty clay), with rotted wood present.

The very small residue of about 125 ml comprised gravel, twig fragments, and hardened wood fragments with some iron concretion on surfaces or impregnating them. One or two of the larger wood fragments might perhaps have been 'chips' from woodworking or felling. A few insects were picked from the residue, most being aquatics.

This subsample yielded a small washover of about 80 ml of plant debris, mainly slightly decayed twig fragments (including alder, *Alnus glutinosa* (L.) Gaertner), and some very decayed wood, as well as root fragments, some bearing nodules. These and the other remains point to alder carr, although a few taxa perhaps hint at some disturbance of the environment. Preservation of fruits and seeds was mostly good, though there was some 'silting'.

Context 225 [Fill of trackway ditch 207 overlying Context 223]

Sample 11/T (3 kg/4.7 litres sieved to 300 microns with paraffin flotation; approximately 5 litres of unprocessed sediment remain)

Moist, varicoloured (mostly light to dark grey but also shades of brown and yellow-brown from light to dark), crumbly and sticky (working soft), slightly humic, slightly clay silt, with fine and coarse herbaceous detritus and twigs present.

The large residue of about 700 ml comprised twiggy debris and finer herbaceous material—there were alder twigs, as in the previous sample. Plant material was generally very well preserved (a few fragments of unidentified herbaceous detritus retained a greenish colour), with some silting. A range of remains of alder (fruits, buds, male catkin fragments and female cone axes) was present, along with the twigs of this species, and the other taxa present were again consistent with an origin in alder carr, with some areas of open water.

The large flot, of about 15 ml, consisted almost entirely of fragments of invertebrates, mostly insects. Preservation was mostly quite good and sometimes excellent, although some remains were fairly fragmentary (E 1.0-2.5, mode 2.0 weak, F 1.0-3.5, mode 2.0 weak). Aquatic insects were abundant (most of the immatures probably fell in this category), large numbers of corixid (water boatman) fragments, and numerous remains of *Ochthebius* and hydrophilines being recorded. Terrestrial habitats were represented, for example, by *Phyllopertha horticola* (Linnaeus) and *Melolontha* sp. (grassland), *Aphodius* sp. (dung), and *Trixagus* sp. (dead wood). There were probably just sufficient terrestrial insects for some reconstruction of local ecology to be made and water quality could be determined in detail. The flot would require a substantial amount of time for sorting, and many identifications would be critical.

Context 210 [Fill of trackway ditch 207 overlying Context 225]

Sample 13/T (3 kg/5.2 litres sieved to 300 microns with paraffin flotation; approximately 3 litres of unprocessed sediment remain)

Moist, light to mid grey-brown to mid to dark brown, crumbly to layered (working soft), slightly clay slightly silty amorphous organic sediment, with abundant wood/woody root and twig fragments.

There was an extremely large residue of about 3150 ml of woody and herbaceous detritus, with some small branches of alder (to 100 x 25 mm diameter) and much twiggy debris, very like that seen in the sample from Context 209 (see below). The well-preserved fruits and seeds were mainly alder, blackberry (*Rubus fruticosus* agg.), and raspberry (*R. idaeus* L.). Much of finest fraction appeared to consist of very decayed tree leaf fragments. There was a trace of charcoal (to 3 mm).

The very large flot of about 50 ml was rich in plant debris, mainly willow twig epidermis fragments. Preservation of the insect remains varied substantially, from good to poor (E 1.5-4.0, mode 2.0 weak; F 1.5-3.5, mode 2.5 weak). A few fossils showed local (patchy) decay, notably some *Sitona* weevils. Beetles were abundant, and there were also representatives of other insect groups (several bugs), numerous mites (*Acari*) and some *Daphnia* (water flea) ephippia (resting eggs). Aquatics were important both in terms of individuals and species, and waterside/damp ground taxa well represented also. Terrestrial insects were sufficiently numerous for an attempt at reconstructing local ecology; there were several dung beetles (*Aphodius*) of four or more species, some terrestrial plant feeders, a chafer (*Melolontha* sp.), and at least four, perhaps six, tree-associated beetles. Grazing land

and trees are thus suggested. Detailed recording of this material would give a useful ecological reconstruction, though the flot would take a very long time to sort.

Context 209 [Fill of trackway ditch 207 overlying Context 210 and separated from it by sterile layer 208] Sample 3/T (3 kg/4.9 litres sieved to 300 microns with paraffin flotation; approximately 6 litres of unprocessed sediment remain)

A roughly equal mix of moist, light grey to light to mid blue-grey (with some areas of mid orange-brown, perhaps mineral staining), sticky to layered in places (working soft), slightly silty clay and fine and coarse herbaceous detritus (including wood/twig/branch fragments).

The very large residue of about 1650 ml consisted of woody and herbaceous plant detritus (of which only a small amount was checked). The coarser material was 'twiggy', though the fragments were very worn and fragmented (perhaps transported by flowing water); the larger pieces were ash (*Fraxinus*). Most other remains were from woody taxa, especially seeds of blackberry with some raspberry, but also alder and even alder buckthorn (*Frangula alnus* L.), with a few marsh or fen taxa. Formation of this deposit in a fen carr environment (though with drier areas supporting ash trees) seems the most likely interpretation; no evidence for human activity was noted from the plant remains at this horizon.

There was a very large flot of about 60 ml, perhaps mainly small willow twig epidermis fragments, and some further wetland taxa represented by well preserved fruits and seeds. Insect remains were numerous, though variably preserved (E 2.0-4.0, mode 2.5 weak; F 2.0-4.0, mode 2.5 weak; trend to orange brown then pale 1-3, mode 2.0 weak). Aquatics predominated, *Ochthebius*, *Hydraena* and *Limnebius* species being the most abundant but accompanied by a wide range of other taxa. There were also appreciable numbers of *Daphnia* resting eggs. Non-aquatics included a range of species likely to have lived in waterside or damp ground habitats, but also some presumably from further afield. Among the latter were taxa suggesting grassland (e.g. the chafers *Phyllopertha horticola* (Linnaeus) and *Melolontha* sp.), and several dung beetles (*Aphodius* spp.), suggesting that grazing land may have existed nearby. This subsample assemblage would provide a useful reconstruction of conditions at the point of deposition, and pointers to the wider landscape. The flot would be slow to sort, and many of the identifications would be time-consuming.

Context 226 [Fill of trackway ditch 207 overlying Context 209]

Sample 12/T (3 kg/4.7 litres sieved to 300 microns with paraffin flotation; approximately 5 litres of unprocessed sediment remain)

Moist, mid grey-brown to mid to dark brown, crumbly (working soft), very humic, slightly clay silt, with some small lumps (to 20 mm) of light to mid grey clay silt and some larger patches (to 70 mm) of mid grey clay. Rotted wood/woody root and twigs were common and stones (20 to 60 mm), including quartz pebbles, were present.

There was a large residue of about 1000 ml of granular woody debris, mainly wood and bark, and including some rod fragments of ash (to 85 x 30 mm), one of which may have had an oblique cut end (there were perhaps also some wood 'chips' in this sample). Most of the well preserved, but not abundant, fruits and seeds were consistent with deposition in alder carr by open water. There was a trace of charcoal (to 10 mm).

The large flot of about 40 ml was fine plant debris, mainly willow twig epidermis fragments (and some leaf?), with fairly numerous insects. These last were variably preserved, many being in excellent condition, others very degraded (E 1.5-4.0, mode 2.5 weak; F 1.5-4.0, mode 2.5 weak). Aquatics (beetles, especially *Ochthebius* sp., and *Daphnia*) predominated, the range of taxa suggesting a rather rich ecology, but there were also terrestrial species from various habitats including herbaceous vegetation and trees. Shade (such as might be found below trees) was implied by the bug *Drymus brunneus* (Sahberg). The green chafer *Cetonia* sp. may have lived its larval life in wood mould, or in richly organic soil. There were some unfamiliar beetles requiring further investigation. This group would give a useful ecological reconstruction.

Context 286 [Secondary fill of ring ditch 288]

Sample 27/T (3 kg/2.5 litres sieved to 300 microns with washover; approximately 15 litres of unprocessed sediment remain)

Moist, light to mid grey-brown to mid grey, stiff (working plastic), slightly sandy clay. Rotted charcoal, stones (2 to 20 mm), ?modern rootlets and some small fragments of ?mortar/plaster, were present.

The small residue of about 250 ml consisted of iron-stained sand and gravel with further iron-rich concreted material, perhaps largely root casts/moulds. Appreciable numbers of insect fragments were present in the washover, and it is possible that this sample would yield a useful (if small) fauna if a larger subsample were processed by paraffin flotation.

This subsample yielded a washover about 120 ml of woody and herbaceous detritus, with some well

preserved seeds, some showing silting, and a little charcoal (to 10 mm). The presence of the charcoal, uncharred seeds and fruits of some weeds characteristic of nutrient-enriched soils, some other taxa perhaps originating in scrub or woodland-edge habitats, and of a single eroded glume wheat (*Triticum*, probably emmer or spelt wheat, *T. dicoccon* Schrank or *T. spelta* L., respectively) spikelet fork fragment points to a deposit in which some human activity in the vicinity can be detected.

Context 290 [Primary fill of ring ditch 276]

Sample 28/T (3 kg/4.3 litres sieved to 300 microns with washover; approximately 5 litres of unprocessed sediment remain)

Just moist, varicoloured (light to dark shades of grey, brown and grey-brown, with some areas of mid yellow-brown), crumbly (working soft), clay silt (some areas much more clay and these work plastic rather than soft). Some ?modern rootlets and stones (20 to 60 mm) were present.

The small washover of about 25 ml comprised charcoal (to 20 mm), with some woody and herbaceous detritus; the only other charred remains were a single 'tuber' of false oat-grass, *Arrhenatherum elatius* ssp. *bulbosum* (Willd.) Schübler & Martens and a trace of unidentified charred herbaceous plant material (together, perhaps most likely to have arrived from the burning of turves?). Preservation of uncharred plant material in this fraction was often rather poor and the concentration of remains was low. A second washover taken from the residue yielded about 100 ml of material which included further wood (some of it perhaps worked) and charcoal. The mineral fraction comprised sand and small gravel.

The washover also included small numbers of insect remains from aquatic and terrestrial habitats. Paraffin flotation of a 3-5 kg subsample would probably give an assemblage of limited size, but which would provide a general view of ecology.

Context 316 [Upper fill of ring ditch 312]

Sample 35/T (3 kg/3 litres sieved to 300 microns with washover; approximately 35 litres of unprocessed sediment remain)

Moist, varicoloured (light grey and light brown to dark grey-brown and shades between), stiff (working plastic), clay, with patches of mid to dark brown clay silt and also ?ashy in places (often coating the lumps of clay). Stones (of 6 to 20 and over 60 mm), rotted ?wood and ?charcoal (or black ash) and modern rootlets were present.

The washover for this subsample was of about 20 ml and consisted of fine plant detritus, essentially modern roots, but with a trace of charcoal. There were a few rather oxidised/worn remains of fruits and seeds of no interpretative value. The large residue was about 900 ml, of which about half formed a 'heavy' washover of very decayed and iron-impregnated wood and charcoal (to 25 mm), a trace of bone, and some somewhat reddened ?iron-concreted sediment. There was a single small fragment of charred ?oat (*Avena*) awn ('beard').

Context 344 [Fill of ?posthole 342]

Sample 42/T (3 kg/2.9 litres sieved to 300 microns with paraffin flotation; approximately 10 litres of unprocessed sediment remain)

Just moist, mid to dark grey-brown to dark brown, brittle to crumbly, slightly sandy slightly clay silt, with some light to mid brown ?ashy areas and pale grey lumps of clay (to 20 mm). Rotted wood, flecks of ?charcoal and modern rootlets were present.

From the moderate-sized residue of about 500 ml, a little over half was extracted as a washover of wood (mostly rather decayed), with some charcoal (to 10 mm), and modern roots. The remainder was sand and gravel, with some iron-varnished ?root cast fragments and quite a lot of undisaggregated, slightly concreted sediment.

The small flot included a few fragments of wood, bark charcoal, and some modern roots; there were a few uncharred seeds, also perhaps modern. Preservation of plant material was a little variable, but essentially good, though the concentration of remains was low. There were also several earthworm egg capsules (which may have been intrusive), traces of very decayed insect cuticle, and a single beetle fragment which appeared suspiciously well preserved and was thus probably modern.

Context 368 [Upper fill of feature 345]

Sample 48/T (3 kg/3 litres sieved to 300 microns with washover; approximately 15 litres of unprocessed sediment remain)

Just moist, mid brown to mid grey-brown (some areas light to mid orange-brown), brittle (working crumbly), slightly clay silt, with some patches of light to mid brown stiff clay. Stones (6 to 20 mm), rotted charcoal (or ?black ash), animal bone and modern rootlets were present.

The rather small residue (dry weight 0.58 kg) was mostly stones (to 50 mm), with some sand, mortar/plaster (11 g, to 28 mm), modern rootlets (<1 g), a very little charcoal (1 g, to 6 mm) and eighteen

fragments of bone (4 g). The only identifiable bone was a pig lateral phalanx.

The small washover of about 75 ml consisted of plant debris, mainly charcoal (and probably mostly willow/aspens/poplar, *Salix/Populus*) in a tangle of modern roots. There was a single charred wheat grain and some modern earthworm egg capsules and insect larvae. The finest fraction contained some rush (*Juncus*) seeds and some very decayed wood and perhaps bark 'sclereids' (woody tissue remaining from the decay of some kinds of bark), as well as a trace of insect cuticle.

Discussion and statement of potential

Plant remains preserved by anoxic waterlogging were present in quantity in many samples, especially the fills of trackway ditch 207, and preservation was often very good. Preservation of insects was quite variable within and between deposits; much of the decay probably happened during deposit formation, although the general yellowing of some assemblages may be recent, perhaps as a result of a lowered water table.

In the series of fills from the trackway ditch 207 the plant and insect remains indicated deposition in a body of water, probably heavily shaded at most stages, in an area of swamp dominated by alder carr. It probably represents a period of abandonment, or at least neglect, following human occupation. In two cases within this sequence (Contexts 223 and 226) there were a few traces of wood fragments which might have originated in woodworking or cutting of timber, with a very little charcoal in Contexts 210 and 226. The other samples included some assemblages (especially from Context 286, a secondary ring ditch fill) which are more likely to have formed through deposition close to an area of human activity. Overall, the remains gave no strong indications either way in favour of the site being a settlement or industrial area.

On the assumption that they can be dated reasonably closely (if necessary AMS dating could be employed), the succession of fills of the trackway ditch (207) deserve closer bioarchaeological examination. Subjectively,

the insects from these deposits suggest a variable degree of shading by trees, with Context 226 (the uppermost of the assessed layers) perhaps representing the least dense canopy. Combining the evidence from plant and insect macrofossils with the excavation record may reveal a significant change in local human activity, perhaps a phase of clearance in view of the 'worked wood fragments and charcoal.

Detailed recording of the insects would be rewarding in view of the presence of various chafers and wood-associated taxa (mainly anobiids and scolytids), since indications of the wider landscape should be obtainable.

Recommendations

Evidence for human occupation was extremely limited and processing of larger samples to extract, for example, charred remains of plants of economic value does not appear to be promising for the two cases where traces of cereal remains were noted.

The insect remains could provide a useful reconstruction of ecology within and around Cut 207. Providing dating can be made reasonably close, it is suggested that the insects from this feature are analysed in detail, and the evidence combined with that already obtained from the plant macrofossils.

Material should be re-examined to check for the presence of wood fragments resulting from woodworking or felling.

Retention and disposal

All of the remaining sediment, together with the remains extracted from the processed subsamples, should be retained for the present.

Archive

All material is currently stored by Palaeoecology Research Services (Unit 8, Dabble Duck Industrial Estate, Shildon, County Durham), along with paper and electronic records pertaining to the work described here.

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