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Technical report: Plant, invertebrate and fish remains recovered from samples from Sprotbrough Hall Gardens, Sprotbrough, South Yorkshire (site code: OSA01EX03)

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by

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Summary

Plant, invertebrate and fish remains were investigated from a variety of deposits of early medieval to modern date revealed by excavations at Sprotbrough Hall Gardens, Sprotbrough, South Yorkshire.

Plant and invertebrate remains were present at low concentrations in most of the samples, though often restricted to small quantities of wood charocal and charred grains. Three deposits gave more interpretatively useful assemblages, Contexts 2211, 3084 and 4000. Context 2211, interpreted as a medieval ?cess pit fill, did indeed contain human faecal material, as shown by the presence of eggs of the intestinal parasitic nematode Trichuris trichiura *and supported by the plant, other invertebrate and fish remains. Remains from the medieval ditch fill Context 3084 indicated that this feature held standing water and that the surrounding area was neglected and overgrown. There were no indications of animal grazing in the immediate vicinity or of rubbish being dumped by people. Context 4000 (an 18th/19th century dump of ?tanning waste) gave small assemblages of plant and insect remains. The former included some food remains and aquatic taxa and the latter was dominated by grain pests. Neither gave any evidence for tanning waste and, taken together with the other recovered components, suggest dumping of rubbish of a more general nature. If Context 4000 received an input of material associated with the stables (either directly or indirectly) this would explain the presence of the aquatics (arriving with water) and grain pests (infesting feed).*

Small concentrations of fish remains were recovered from six of the samples (most from Sample 12, Context 2211) and, on the whole, preservation was quite good. The recovered fish remains provided too small an assemblage for detailed interpretation, or for discerning any specific patterns in the relative abundances of different species or elements through time. However, they do show that fish were eaten, perhaps as an occasional supplement to the diet, but clearly never forming a major component of it.

None of the samples were rich in biological remains and no unusual records were made. The data are useful in that they come from an area (South Yorkshire) in which remains from dated archaeological deposits are rather rare, however.

KEYWORDS: SPROTBROUGH HALL GARDENS; SPROTBROUGH; SOUTH YORKSHIRE; TECHNICAL REPORT; EARLY MEDIEVAL TO MODERN; MEDIEVAL; POST-MEDIEVAL; MODERN; PLANT REMAINS; CHARRED PLANT REMAINS; CHARRED GRAIN; INVERTEBRATE REMAINS; INTESTINAL PARASITIC NEMATODE EGGS; *TRICHURIS TRICHIURA*; INSECTS; GRAIN PESTS; VERTEBRATE REMAINS; FISH BONE

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Introduction

Archaeological excavations were carried out at Sprotbrough Hall Gardens, Sprotbrough, South Yorkshire (NGR SE 5399 0176) by On-Site Archaeology (OSA) between July 2001 and January 2002.

Sprotbrough Hall was probably constructed in 1685 and the extensive parks and gardens were laid out during the late 17th and the early part of the 18th centuries. Little is known of the site prior to the construction of the hall, though there are records of a manor house that appears to have been demolished (by 1671) to make way for the new building.

Seven phases of activity were identified:
Phase 1 – early medieval (or possibly earlier): a group of pits, linear gullies, postholes and a ditch (2198) which ran beneath the northern wall of the medieval building
Phase 2 – early medieval: an extensive soil horizon sealing the Phase 1 deposits
Phase 3 – medieval: features associated with a stone-built building
Phase 4 – medieval or ?post-medieval: a series of pits, dumps and surfaces post-dating the demolition of the medieval building (Phase 3)
Phase 5 – post-medieval/early modern (17th to ?18th century): features associated with a period of small-scale industrial activity
Phase 6 – early modern (18th to 19th century): dumping and levelling layers sealing the Phase 5 features
Phase 7 – modern (19th to 20th century): structures relating to the garden over the last 150 years

Twenty-two bulk sediment samples ('GBA'/'BS' *sensu* Dobney *et al*. 1992) were collected during the excavation. On the basis of an assessment of the remains from six of the deposits, fifteen (representing deposits from Phases 3 through 6) were selected for analysis. These were submitted to Palaeoecology Research Services Limited (PRS), County Durham, for consideration and this report presents the results of the analyses of the plant, invertebrate and fish remains recovered.

Methods

For the initial assessment, samples of whole sediment were processed by the excavator, who submitted dried 'flots' and residues. For the analysis, additional material from the assessed deposits and new samples from those not assessed were processed. Six such bulk sediment samples were processed to 1 mm (with a 300 micron sieve for the lighter washover fraction) by OSA. In addition, eight samples were processed by PRS, broadly following the techniques of Kenward *et al*. (1980; 1986), for the recovery of plant and invertebrate macrofossils. The lithologies of these samples were recorded, using a standard *pro forma*, prior to processing. One sample containing abundant charcoal was examined as a 'SPOT' sample (*sensu* Dobney *et al*. *op*. *cit*.).

Plant remains (and the general nature of the wet residues, flots and washovers) were recorded briefly by 'scanning', identifiable plant taxa and other components being listed directly to a PC using *Paradox* software. Notes on the quantity and quality of preservation were made for each fraction. Abundance of all constituents (related to the original size of the subsample) was recorded using a four-point scale from 1 (one or a few individuals or fragments or a very small component of the matrix) to 4 (abundant

remains or a major/dominant component of the matrix).

The manuscript lists of invertebrates (other than molluscs) were entered to a *Paradox* database using systems written by JC, for analysis and long-term storage. The data were interrogated using *Paradox* to produce a species list in rank order and summary statistics for the assemblage from Context 4000 (Sample 21), and a species list for the site in taxonomic order, following Kloet and Hincks (1964-77). Insects in the flots were recorded using 'detailed recording' *sensu* Kenward (1992). 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).

When the residues were primarily mineral in nature they were dried, weighed and the components recorded.

Four of the deposits were examined for the eggs of intestinal parasitic nematodes using the 'squash' technique of Dainton (1992). Measurements of maximum length (including polar plugs) and maximum width were noted using a calibrated eyepiece graticule at 600x magnification. Although primarily for the detection of intestinal parasitic nematode eggs the 'squash' technique routinely reveals other microfossil remains, and where present (or markedly absent) these have also been noted. The size range quoted for *Trichuris trichiura* (Linnaeus) follows that given by Ash and Orihel (1984). (Significantly larger *T. trichiura* eggs are occasionally reported in modern parasitological samples—this is usually in response to the use of anthelmintics, or may be a confusion with *T. vulpis* which children sometimes acquire through geophagia.) Size ranges for the eggs of trichurids of other common domestic animals are from several sources including Kassai (1998) and the WWW pages of the College of Veterinary Medicine, University of Missouri-Columbia.

Of the vertebrate remains recovered from the samples only the fish bones were recorded by PRS. Identifiable fragments of other vertebrates were returned to the excavtor to be recorded separately. Semi-subjective, non-quantitative data were recorded for the fish remains from each context regarding the state of preservation, colour, and the appearance of broken surfaces ('angularity'). Identification was carried out using the PRS modern reference collection.

Results

Sediment samples

The results of the investigations are discussed in context order by phase; a list of taxa recorded, sample-by-sample species lists, and some supporting matter, are presented in Tables 1-7). The samples processed by OSA are designated '/BS' and those by PRS as '/T2'. Archaeological information, provided by the excavator, is given in square brackets. For those samples processed by PRS, a brief summary of the processing method(s) and an estimate of the remaining volume of unprocessed sediment follows (in round brackets) after the sample number. Each of the samples processed by OSA was of 10 or 11 litres (i.e. 1 sample tub). Approximate quantities are given in ml for material initially examined wet (though sometimes dried subsequently in the case of certain residues) and kg (or g) for that recorded dry.

In general, the inorganic fractions of the residues were not recorded in any detail but, unless otherwise stated, were composed primarily of stones and sand. The presence of any artefactual remains was noted, however.

PHASE 3 (MEDIEVAL)

Context 2105 [fill in pit 2106]
Sample 5/BS

There was a small washover (dry weight 42 g) consisting mostly of charcoal and cinder, with a little modern plant detritus. Twelve fragments of unidentified bone (4 g) were sorted from the residue.

Context 2117 [fill in post pipe 2116]
Sample 6/BS

The small washover was of modern plant detritus, mostly roots and rootlets, with a trace of charcoal Thirteen unidentified bone fragments (4 g) were recovered from the residue.

Context 2135 [fill in pit 2136]
Sample 9/T2 (12 kg sieved to 300 microns with washover and microfossil 'squash'; no unprocessed sediment remains)

Just moist, light to mid brown to mid grey-brown (jumbled), crumbly (working soft to more or less plastic), slightly sandy slightly silty clay. Stones (2 to 60+ mm) were common. Rotted charcoal and some burnt large mammal bone were present.

The small washover of about 80 ml consisted of charcoal (to 20 mm in maximum linear dimension), with some tiny roots (which might be ancient), and fish scale (to 5 mm). Material sorted from the residue comprised further charcoal, an additional fragment of fish scale, a single unidentified land snail and three fragments of charred hazel (*Corylus avellana*) nutshell.

The 'squash' subsample was mostly inorganic, with a trace of organic detritus. No eggs of intestinal parasites or other identifiable microfossils were seen.

Context 2152 [fill in pit 2202]
Sample 11/T2 (10 kg sieved to 300 microns with paraffin flotation, washover and microfossil 'squash'; no unprocessed sediment remains)

Just moist, mid grey-brown to mid grey, crumbly, (working more or less plastic), slightly sandy, slightly silty clay. Stones (2 to 6 mm) and charcoal were present, while slightly larger stones (6 to 20 mm) were common.

There was a small washover (about 30 ml) of modern roots and charcoal with some elder (*Sambucus nigra*) seed fragments and very rare and poorly preserved charred cereal grains (including oats, *Avena* and bread/club wheat, *Triticum 'aestivo-compactum'*) as well as fish bone (to 5 mm) and scale. Material sorted from the residue comprised a little coal and charcoal (to 5 mm). The small flot included a few elder seeds and one bread/club wheat grain, but contained no significant invertebrate remains.

The microfossils 'squash' was almost entirely inorganic, with only a trace of organic detritus. No eggs of inetstinal parasites were seen but a few pollen grains/spores, fungal hyphae and ?phytolith fragments were noted.

Context 2211 [fill of possible cess pit 2212]
Sample 12/T2 (13 kg sieved to 300 microns with paraffin flotation, washover and microfossil 'squash'; no unprocessed sediment remains)

Moist, mid to dark grey-brown, crumbly to slightly sticky (working soft), clay silt. Stones (2 to 60 mm) were present, uncharred plant material, charcoal, ?fruitstones/pips and ?faecal concretions were all present.

The small washover of about 120 ml was of charcoal (to 20 mm) and modern roots, with some (mostly) very decayed blackberry (*Rubus fruticosus* agg.) seeds, and traces of grains of oat, and bread/club wheat. The few other plant taxa were not inconsistent with the accumulation of food waste as in a cess pit, but the material sorted from the residue comprised about 10 ml of (mainly) mineral-replaced seeds of *Prunus* (probably sloe, *P. spinosa*, since there were a few charred fragments of sloe fruitstone) which are certainly a good indication of the presence of faecal material. Other remains included a few further oat and bread/club wheat grains, some quite well preserved, and a little bone.

The small flot was mainly blackberry seeds with one wheat grain and some (probably ancient) rootlet fragments. It contained quite large numbers of what were clearly modern fly larvae but also fly puparia (at least 28) that appeared quite strongly mineralised and more likely ancient. Preservation of adult insects was not recordable, but poor. The only recognisable beetle was a scrap of elytron from a woodworm, *Anobium* ?*punctatum*.

The 'squash' subsample of raw sediment was mostly inorganic, with some organic detritus. Some pollen grains/spores and ?phytolith fragments and a few fungal spores and diatoms (of at least two different types) were noted. A single *Trichuris* egg (rather poorly preserved and having lost both polar plugs) and two possible ?*Ascaris* eggs were recorded. Additional 'squash' subsamples were taken from the ?faecal concretions recovered from the residue. These were largely composed of mineralised organic material and contained well preserved, though rather thinly

distributed, *Trichuris* eggs. A total of 15 slides gave 20 trichurid eggs, of which 15 retained both polar plugs and were measured (of the other 5 eggs, 2 had no polar plugs and the rest 1). Three possible ?*Ascaris* eggs were only tenatively identified and so not measured. The egg measurements and summary statistics are presented in Tables 6 (a and b).

Context 3066 [fill in ditch 3081]
Sample 14/BS (1 tubful, weight not known)

This sample was rewashed by PRS. There was a small washover of a few ml of charcoal (to 15 mm), with modern roots, and a trace of elder seeds; the material sorted from the residue contained more charcoal and a little coal, plus a single tentatively identified charred pea (*Pisum sativum*) cotyledon.

Context 3084 [fill in ditch 3081]
Sample 16/T2 (14 kg sieved to 300 microns with washover and subsequent paraffin flotation; no unprocessed sediment remains)

Moist, mid grey-brown (with patches of light golden-brown), soft (working more or less plastic), silty clay, with some stones (2 to 20 mm) present.

The small washover of about 160 ml was mostly organic detritus, consisting mainly of rather granular to flaky woody debris, including bark and charcoal (both to 20 mm). There were some charred cereal grains, though these were very distorted—they were mainly bread/club wheat, with a single ?rye (*Secale cereale*) grain and a trace of oats. Two half-'seeds' of hemp, *Cannabis sativa* were also noted, one well preserved, the other much less so. Other plant remains mostly pointed to the kind of vegetation forming in an area of neglected disturbed land—mainly plants of the phytosociological class Artemisietea such as cow parsley (*Anthriscus sylvestris*), hemlock (*Conium maculatum*) and stinging nettle (*Urtica dioica*), with some consistent with more heavily disturbed ground, though the assemblage was not large and only hemlock was present in number sufficient to warrant a score of '2' on the four-point scale used.

The flot (made by AH from the washover) was small but included appreciable amounts of insect fragments, which were almost all strongly yellowed and often fragmented (E 2.0-4.0, mode 4.0 strong; F 2.0-4.0, mode 3.0 weak; trend to yellow 2-4, mode 4, following the scheme of Kenward and Large, 1998). None of the beetles was represented by remains of more than a single individual, however. Almost half of the assemblage consisted of 'outdoor' forms, including numerous aquatics (there were large numbers of Cladocera (water flea) ephippia (resting eggs), and numerous chironomid midge larvae); this ditch fill clearly formed in water. There were species likely to have come from nearby herbaceous vegetation, and a single bark beetle (*Scolytus* sp.). A few species indicated decaying matter, but this may have been natural litter at the water's edge. There was no clearly synanthropic component, and no dung beetles.

Context 3123 [upper fill in pit 3124]
Sample 19/BS

The tiny washover (11 g) was of small lumps of concreted sediment that had not disaggregated, with a little unidentified charcoal and fragments of modern root. The small residue (332 g) was also mostly concreted sediment, with a few fragments of unidentified mammal bone.

Context 3221 [fill in pit 3124, ?industrial]
Sample 17/BS

There was a washover of a few ml of angular charcoal, probably all oak (*Quercus*, to 10 mm), with some modern rootlets. The residue of about 200 ml was mainly charcoal with some gravel (to 25 mm); the former included oak and some hazel (*Corylus*) roundwood fragments (to 10 mm). No particular light is shed on the nature of this pit fill—industrial or otherwise—from these remains.

PHASE 3 TO 5 (MEDIEVAL TO EARLY MODERN 17TH/18TH CENTURY)

Context 2103 [primary fill of lime pit 2094]
Sample 10/SPOT

This sample was approximately half fine charcoal, with occasional rotted, and very fragile, larger fragments (to 10 mm) which disintegrated on handling. The sediment matrix was of moist, light grey-brown to light to mid yellow-grey-brown, crumbly, sandy clay silt, with lumps of rotted ?lime (to 15 mm) common and stones (6 to 60 mm) present. Wood species identification of the charcoal was not possible.

PHASE 4 (LATE MEDIEVAL/POST-MEDIEVAL)

Context 2014 [fill in pit 2111]
Sample 4/BS

This sample yielded a washover of about 240 ml of charcoal (to 20 mm), with some cinders (to 15 mm), and charred fragmentary sloe stones, well-preserved charred barley grains and some rather eroded charred pea seeds. Also present were rather frequent charred

rose (*Rosa*) prickles of various sizes and some long, thin thorns which appeared not to be either from hawthorn (*Crataegus*) or blackthorn, though they could not be identified with certainty. A number of introduced ornamental shrubs might be possible sources.

The residue of about 600 ml comprised further charcoal, along with some angular stone, a single small fragment of glazed pottery, and a little dense metallic (ferrous) slag with charcoal embedded in it. Further charred plant remains of the kinds seen in the washover were present. Along with the rose prickles, some of the charcoal appeared to be from rose stems, but there was certainly also charcoal of oak, ash (*Fraxinus*), willow/poplar (*Salix/Populus*) and unidentified conifer, and probably also fruit tree wood (cf. Pomoideae, including apple, pear, rowan and hawthorn). Traces of cereals other than barley were noted—wheat and oats, and other material perhaps reflecting the disposal of food waste were small fish scales and bone, and burnt eggshell fragments. Overall, the pit appears to have received waste in the form, largely, of ash and charred plant material, mainly wood charcoal.

Context 2027 [well fill]
Sample 1/T2 (17 kg sieved to 300 microns with paraffin flotation and microfossil 'squash'; no unprocessed sediment remains)

Waterlogged, light to mid grey-brown, slightly sticky and somewhat thixotropic to soft, (working crumbly and sticky), slightly sandy, clay silt. Cinder and charcoal, and ?beetles were present.

There was a small washover of about 75 ml of modern roots and fine coal fragments with a trace of elder seeds. The small flot contained only traces of insect remains, mostly unidentifiable scraps of cuticle, a single henbane (*Hyoscyamus niger*) seed, with some fragments of modern plastic sponge. Preservation of the insect remains was poor but not recordable. The few identifiable remains included a fragment of an elytron of the spider beetle ?*Tipnus unicolor* and an earthworm egg capsule. Traces of some small aquatic crustaceans, ostracods, were also present, presumably consistent with the nature of this feature as a well.

Material sorted from the residue comprised about 50 ml more coal (to 15 mm), with a little charcoal and cinder (to 10 mm, ~3 g in total), four fragments of mussel (*Mytilus edulis*) shell, a single charred barley (*Hordeum*) grain, a small metal object (<1 g) and three fragments of unidentified land snail.

The 'squash' sample was almost entirely inorganic, with a trace or organic detritus and a few pollen grains/spores and ?phytolith fragments. No eggs of intestinal parasites were seen.

Context 2144 [fill of culvert 2145]
Sample 7/T2 (12 kg sieved to 300 microns with wshover; no unprocessed sediment remains)

Just moist, mid grey-brown, crumbly to unconsolidated, (working soft), clay silt. Stones (6 to 60 mm) were common and larger stones, charcoal and modern rootlets were present.

The small washover of about 50 ml comprised modern roots, coal, and a little charcoal (to 10 mm); the material sorted from the residue consisted of a little more coal and charcoal and a single fragment of mussel shell.

PHASE 5 (EARLY MODERN 17TH TO 18TH CENTURY)

Context 4118 [dump]
Sample 22/T2 (2.7 kg sieved to 300 microns with washover; no unprocessed sediment remains)

Moist, mid grey-brown, crumbly (working plastic), moderately stony (stones 2 to 20 mm were common), slightly silty clay. Cinders were present.

The small washover of about 35 ml comprised charcoal (to 10 mm, including oak and willow/poplar), with coal, cinders, fish scale, fragmentary land snails (at least 14 *Aegopinella nitidula*, plus fragments almost certainly representing further individuals of this species) and freshwater bivalves, a minimum of 11 *Pisidium* sp. valves. This gave little evidence for the nature of the dump—the land snails are of a species common on disturbed ground, and thus favoured by human activity, and the bivalves most likely arrived with waste water.

PHASE 6 (18TH TO 19TH CENTURY)

Context 4000 [dump of ?tanning waste]
Sample 21/T2 (5 kg sieved to 300 microns with washover and subsequent paraffin flotation of this fraction; approximately 4 litres of unprocessed sediment remain)

Moist, mid to dark grey-brown to mid to dark grey, crumbly to slightly sticky (working soft and sticky), slightly sandy clay silt. Coal/cinder was abundant.

The very small washover of about 50 ml was mainly charcoal (to 10 mm). Some scraps of insect cuticle were present, so the washover was subjected to paraffin flotation (by AH) to check for the nature of these remains. Rare uncharred (and rather poorly preserved) seeds of fig (*Ficus carica*) were noted, together with at least one seed of henbane (probably a weed) and some

'fronds' of duckweed (*Lemna*), presumably ancient and perhaps arriving with waste water. The very large residue of about 1500 ml was mainly cinders (to 40 mm), with some gravel/stone, coal, eggshell, traces of mussel shell, a little metal (iron) slag and other metal objects (including of copper/copper alloy), and (very fragmentary, all <5 mm) bone. There was no evidence for tanning from the plant remains.

Paraffin extraction produced a small flot with a strong orange tinge, containing modest numbers of insect remains whose preservational condition was poor (E 4.0-5.0, mode 4.5 distinct; F 2.5-5.0, mode 3.5 weak; trend to orange 3-4, mode 4.0). Uniform colour change of this kind may indicate recent de-watering of the deposits (Kenward and Hall 2000; in press). Some remains were too decayed for identification.

The range of insects recovered was narrow, both numerically and ecologically. Much the most abundant was *Oryzaephilus surinamensis*, the 'saw-toothed grain beetle' (12 individuals), which was accompanied by a single elytral scrap of the grain weevil, *Sitophilus granarius*. Other species typical of food storage environments were the spider beetles *Tipnus unicolor* (4) and *Ptinus* sp. (1), and *Aglenus brunneus* (1; though this may be a post-depositional invader, Kenward 1975). *Anobium punctatum*, the woodworm, with three individuals, is typical of deposits formed in and around buildings, while the death watch beetle *Xestobium rufovillosum* is in the north of England confined to timbers in long-lived buildings. Of the remaining fauna, *Omalium* ?*rivulare* (5) and *Carpelimus* ?*bilineatus* (1) are frequent in occupation-site deposits, the former being most typical of layers formed from foul matter including faeces (perhaps also the source of the fig seeds). Only a single minute scrap of elytron from a weevil, perhaps *Hypera punctata* indicated habitats outside buildings: it may have originated as 'background fauna', or have been imported with hay or even food. As with the evidence from the plant remains, there was nothing to suggest that the deposit was tanning waste.

Fish remains from the samples

The records of fish bone recovered from the samples are summarised in Table 7. Small concentrations of fish remains were recovered from six of the samples, most of which came from Sample 12 (Context 2211), a possible cess pit fill. Preservation of the bones was, on the whole, quite good, although fragments from Context 2211 were somewhat battered in appearance. A small number of the herring (*Clupea harengus*) and eel (*Anguilla anguilla*) vertebrae from this context were crushed, damage consistent with the bones having been consumed and digested.

The species identified throughout the phases represented (3, 4, 5 and 6) were mainly marine or migratory, most being herring and eel, although fragments of larger fish such as gadids and haddock (*Melanogrammus aeglefinus*) were noted in very small quantities. Eel may represent evidence for the utilisation of riverine resources, but could also have been caught in estuarine waters. The presence of Cyprinidae (members of the carp family, freshwater species) remains from Contexts 2135, 2027 and 4118 and possible perch (*Perca fluviatilis* L.) from Contexts 2027 and 4000 (respectively), however, suggest that some fishing in local rivers or streams was undertaken.

Skeletal element representation suggested that whole eel and herring were brought to the site, but too few fragments were recovered for confident interpretation.

Discussion

With the exception of two of the medieval deposits—?cess pit fill 2211 and ditch fill 3084—and the 18th/19th century dump Context 4000 (Sample 21), these deposits yielded very few biological remains, generally restricted to a little charcoal, weed seeds and occasional charred cereal grains. Even the deposits mentioned had only sparse remains given the large size of the samples processed.

Eggs of trichurid and ?ascarid intestinal parasitic worms were recorded from the ?cess pit fill 2211. Identification of trichurids to species from their eggs is problematic in that the size ranges for different species often overlap significantly (Figure 1). In the case of the remains from this site the problem is to distinguish between *Trichuris trichiura*, the whipworm of humans, and *T. suis* (Schrank), of pigs; a particularly difficult task given that the usual size range for *T. trichiura* is a wholly contained subset of that for *T. suis*. Table 6a shows the trichurid egg measurements for the sample and Figure 1 shows the measurements with commonly quoted size ranges for *T. trichiura* and other trichurids of some common domesticated animals given as boxed overlays. Figure 2 shows the measurement data on shorter scale axes including error bars. All bar one of the measurements fall within the range for modern

T. trichiura. This exception may represent a single *T. suis*, an aberrant egg, or could reflect 'in-ground' changes in egg morphology (all of the overlay boxes for egg size ranges are based on limited sets of published 'modern' data). No real study of changes in egg morphology caused by varying ground conditions and states of preservation has been undertaken and comparison with modern data, though valid, must, of necessity, be cautious. Summary descriptive statistics are presented as Table 6b.

Similarly, the eggs of the ascarids *Ascaris lumbricoides* (Linnaeus) and *A. suum* (Goeze), the maw worms of humans and pigs respectively (though some parasitologists believe that there is just one species of *Ascaris* that infests both humans and pigs) are almost identical. *Ascaris* eggs were only tentatively identified in the subsamples from Context 2211 and Taylor (1955) has remarked that a low ratio of *Ascaris* to *Trichuris* eggs may indicate human rather than pig faeces.

In summary, this deposit, interpreted as a ?cess pit fill, did indeed contain faecal material, as indicated by the presence of the eggs of intestinal parasitic nematodes and supported by the evidence of the plant and invertebrate macrofossils and the fish bones. On balance, it seems certain that Context 2211 contained human faeces and that this confirms the use of feature 2212 as a cess pit.

Plant and invertebrate remains from the medieval ditch fill Context 3084 indicated that this feature held standing water and that the surrounding area was neglected and overgrown. There were no indications of animal grazing in the immediate vicinity (as often evinced by the presence of dung beetles) or of rubbish being dumped by people.

Context 4000 (an 18th/19th century dump of ?tanning waste) gave small assemblages of plant and insect remains. The former included some food remains and aquatic taxa (probably arriving in waste water) and the latter was dominated by grain pests. Neither gave any evidence for tanning waste and, taken together with the other recovered components, suggest dumping of rubbish of a more general nature. An engraving from *c*. 1700 suggests that the site lies in the area of a group of buildings accociated with stables (rebuilt in 1750 and still standing to this day). If Context 4000 received an input of material associated with the stables (either directly or indirectly, e.g. during ground levelling prior to the 1750 rebuild) this would explain the presence of the aquatics (arriving with water) and grain pests (infesting feed).

None of the plant and invertebrate remains are unusual for deposits of their periods, but the records are useful in that they come from an area (South Yorkshire) in which plant and invertebrate remains from dated archaeological deposits are rather rare.

Similarly, the recovered fish remains provided too small an assemblage for detailed interpretation, or for discerning any specific patterns in the relative abundances of different species or elements through time. However, they do show that fish were eaten, perhaps as an occasional supplement to the diet, but clearly never forming a major component of it. Freshwater fish and eels provide evidence of the exploitation of the local riverine resources, whilst the herring, and Gadidae remains in the later phases, indicate that some supplies came from coastal markets. These marine fish may have been fresh, but are more likely to have been cured either by drying and salting or by smoking.

The presence of gadid remains in later deposits is consistent with their increasing importance from the 11th century onwards. Fish bone recovered from the 8/9th century deposits at Fishergate, York (O'Connor 1991) was dominated by freshwater and estuarine species, with a gradual increase in the significance of herring and Gadidae seen in the 11th-15th century assemblage. At the site at North Bridge, Doncaster (Carrott *et al.* 1997), eels, herring and freshwater fish (including Cyprinidae, ?perch and pike) were the

predominant species in deposits of 11th-14th century date.

It must be noted, however, that the differential disposal of the remains of different fish may be responsible for an under-representation of the larger species. The greatest concentration of remains from Sprotbrough was recovered from a cess pit; assemblages from deposits such as this are typically dominated by small species deriving from faecal material.

Archive

Other than that returned to OSA, 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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Table 1. Complete list of plant, invertebrate and fish remains recorded from samples from Sprotbrough Hall Gardens.

M indicates records for material from medieval deposits, P material from post-medieval levels, with brackets for cases where material from that period was only tentatively identified. All the plant remains were preserved by anoxic waterlogging unless otherwise indicated. Order and nomenclature of plants follow Tutin et al. *(1964-80), those for insects follow Kloet and Hincks (1964-77), land snails Kerney and Cameron (1979), freshwater bivalves Janus (1989) and for fish Wheeler (1969). Ecological codes used in calculating statistics for invertebrates are also given (they are explained in Table 4). * = not used in calculating assemblage statistics. The remains were of adults unless stated. Where both secure and tentative identifications for a given taxon were recorded, only the former are listed here.*

PLANTS		
P Coniferae	conifer	charcoal
P *Salix/Populus* sp(p).	willow/poplar/aspen	charcoal
MP *Corylus avellana* L.	hazel	charred nutshell fragments
		charred roundwood fragments
MP *Quercus* sp(p).	oak	charcoal
P *Ficus carica* L.	fig	seeds
M *Cannabis sativa* L.	hemp	achene fragments
M *Urtica dioica* L.	stinging nettle	achenes
M *U. urens* L.	annual nettle	achenes
MP *Polygonum aviculare* agg.	knotgrass	fruits
M *Rumex* sp(p).	docks	fruits
M *Chenopodium album* L.	fat hen	seeds
M *Atriplex* sp(p).	oraches	seeds
M *Stellaria media* (L.) Vill.	chickweed	seeds
M *Agrostemma githago* L.	corncockle	seed fragments
M *Ranunculus* Section *Ranunculus*	meadow/creeping/ bulbous buttercups	charred achenes
P *R. flammula* L.	lesser spearwort	charred achenes
M *Papaver* cf. *rhoeas* L./*dubium* L.	?field/long-headed poppy	seeds
M *Fumaria* sp(p).	fumitories	seeds
M *Rubus idaeus* L.	raspberry	seeds
M *R. fruticosus* agg.	blackberry/bramble	seeds
P		charred seed fragments
P *Rosa* sp(p).	roses	charred prickles
P cf. *Rosa* sp(p).		charcoal
P *Potentilla* sp(p).	tormentil, cinquefoils	charred achenes
P cf. Pomoideae	apple/pear/rowna/hawthorn	charcoal
M *Crataegus monogyna* Jacq.	hawthorn	pyrenes
M *Crataegus* sp./*Prunus spinosa* L.	hawthorn/sloe	thorns
MP *Prunus spinosa* L.	sloe	charred fruitstones
M *Prunus* sp(p).	sloe/plum/cherry, etc.	'mineralised' seeds
P cf. *Prunus* sp(p).		charcoal
M Leguminosae	pea family	charred cotyledons
(M)P *Pisum sativum* L.	?garden/field pea	charred seeds, cotyledons
M *Malva* sp(p).	mallows, etc.	nutlets
M *Anthriscus sylvestris* (L.) Hoffm.	cow parsley	mericarps
M *Aethusa cynapium* L.	fool's parsley	mericarps
M *Conium maculatum* L.	hemlock	mericarps
P *Fraxinus excelsior* L.	ash	charcoal
M *Lamium* Section *Lamiopsis*	annual dead-nettles	nutlets
M cf. *Ballota nigra* L.	?black horehound	nutlets
M *Stachys* sp(p).	woundworts	nutlets
MP *Hyoscyamus niger* L.	henbane	seeds
P		charred seeds
MP *Sambucus nigra* L.	elder	seeds and seed fragments
P *Anthemis cotula* L.	stinking mayweed	charred achenes
P *Chrysanthemum segetum* L.	corn marigold	charred achenes

M *Arctium* sp(p).	burdocks	achenes
M *Sonchus oleraceus* L.	sow-thistle	achenes
MP Cerealia indet.	cereals	charred caryopses
M *Triticum 'aestivo-compactum'*	bread/club wheat	charred caryopses
MP *Triticum* sp(p).	wheats	charred caryopses
M cf. *Secale cereale* L.	?rye	charred caryopses
MP *Hordeum* sp(p).	barley	charred caryopses
MP *Avena* sp(p).	oats	charred caryopses
P *Lemna* sp(p).	duckweeds	fronds
MP *Carex* sp(p).	sedges	nutlets

INVERTEBRATES	
*?*Ascaris* sp.	
**Trichuris trichiura* (L.)	
*Oligochaeta sp. (egg capsule)	u
*Cladocera sp. F (ephippium)	oa-w
Cicadellidae sp.	oa-p
*Psylloidea sp. (nymph)	oa-p
*Diptera sp. (puparium)	u
*Chironomidae sp. (larva)	w
Hydroporinae sp.	oa-w
Helophorus sp.	oa-w
Hydrobius fuscipes (Linnaeus)	oa-w
Cercyon sp.	u
Ochthebius ?minimus (Fabricius)	oa-w
Limnebius sp.	oa-w
?*Catops* sp.	u
Micropeplus fulvus Erichson	rt
Omalium ?rivulare (Paykull)	rt-sf
Carpelimus ?bilineatus Stephens	rt-sf
Anotylus nitidulus (Gravenhorst)	rt
Anotylus sculpturatus group	rt
Stenus sp.	u
Paederinae sp.	u
Staphylininae sp.	u
Aleocharinae sp. A	u
Aleocharinae sp. B	u
Elateridae sp.	ob
Anobium punctatum (Degeer)	l-sf
Xestobium rufovillosum (Degeer)	l-st
Ptinus sp.	rd-sf
Tipnus unicolor (Piller & Mitterpacher)	rt-ss
Oryzaephilus surinamensis (Linnaeus)	g-ss
Monotoma sp.	rt-sf
Aglenus brunneus (Gyllenhal)	rt-ss
Halticinae sp.	oa-p
Apion sp.	oa-p
?*Hypera punctata* (Fabricius)	oa-p
Sitophilus granarius (Linnaeus)	g-ss
Curculionidae sp.	oa
Scolytus sp.	l
*Acarina sp.	u
*Mollusca sp.	
**Mytilus edulis* L.	
**Aegopinella nitidula* (Draparnaud)	
**Pisidium* sp.	

VERTEBRATES
Clupea harengus L.
Cyprinidae sp.
Anguilla anguilla (L.)
Gadidae sp.
Melanogrammus aeglefinus (L.)
Perca fluviatilis L.

Table 2. Plant remains (and other components of the samples) from Sprotbrough Hall Gardens by context. Key to abbreviations: ch—charred; cot—cotyledons; fgts—fragments; inc—including; max dim—maximum dimension; s—seed(s); sf—seed fragment(s).

Context 2105, Sample 5/BS		
bone fgts	1	max dim 10 mm
charcoal	1	max dim 10 mm
cinders	2	max dim 15 mm
Context 2117, Sample 6/BS		
bone fgts	1	max dim 10 mm
charcoal	1	max dim 10 mm
root/rootlet fgts (modern)	1	
Context 2014, Sample 4/BS		
Anthemis cotula (ch)	1	
Avena sp(p).	1	
Cecilioides acicula	1	
Chrysanthemum segetum (ch)	1	very decayed
Coniferae (charcoal)	1	max dim 2 mm
Corylus avellana (ch)	1	
Fraxinus excelsior (charcoal)	1	max dim 5 mm
Hordeum sp(p).	1	
Hyoscyamus niger (ch)	1	
Pisum cf. sativum (cot)	1	
Pisum sativum	1	
cf. Pomoideae (charcoal)	1	max dim 10 mm
Potentilla sp(p). (ch)	1	
Prunus spinosa (ch)	1	fragment(s) only
cf. Prunus sp(p). (charcoal)	1	max dim 10 mm
Quercus (charcoal)	1	max dim 10 mm
Rosa sp(p). (ch prickles)	2	
Rosa sp(p). (prickles)	1	
cf. Rosa sp(p). (charcoal)	1	max dim 15 mm
Rubus fruticosus agg. (ch)	1	fragment(s) only
Salix/Populus sp(p). (charcoal)	1	max dim 10 mm
Sambucus nigra	1	
Triticum sp(p).	1	a single specimen
ash concretions	1	max dim 2 mm
bone fgts	1	max dim 10 mm
burnt bone fgts	1	max dim 5 mm
burnt eggshell fgts	1	max dim 2 mm
charcoal	2	max dim 15 mm
cinders	1	max dim 20 mm
coal	1	max dim 10 mm
eggshell fgts	1	max dim 5 mm
fish bone	1	max dim 5 mm
fish scale	1	max dim 2 mm
gravel	2	max dim 20 mm
mortar	1	max dim 5 mm
moss (contaminant)	1	
pottery	1	max dim 10 mm
slag	1	max dim 30 mm
thorns (ch)	1	
twig fgts (ch)	1	max dim 10 mm

Context 2027, Sample 1/T2		
Hyoscyamus niger	1	
Sambucus nigra	1	
Hordeum sp(p).	1	a single specimen
beetles	1	fragment(s) only
charcoal	1	max dim 10 mm
coal	1	max dim 15 mm
insect cuticle	1	
insects	1	
ostracods	1	
root/rootlet fgts (modern)	1	
snails	1	
sponge fgts (contaminant)	1	
Context 2103, Sample 10/SPOT		
charcoal (very rotted)	3	max dim 10 mm
Context 2135, Sample 9/T2		
Corylus avellana (ch)	1	
charcoal	1	max dim 20 mm
fish scale	1	max dim 5 mm
root/rootlet fgts	1	
twig fgts (ch)	1	
woody root fgts (modern)	1	
Context 2144, Sample 7/T2		
charcoal	1	max dim 10 mm
coal	1	max dim 30 mm
root/rootlet fgts (modern)	1	
woody root fgts (modern)	1	
Context 2152, Sample 11/T2		
Sambucus nigra	1	inc fragments
Cerealia indet.	1	
Triticum aestivo-compactum	1	
Avena sp(p).	1	
charcoal	1	max dim 5 mm
coal	1	max dim 5 mm
fish bone	1	max dim 5 mm
fish scale	1	max dim 5 mm
root/rootlet fgts (modern)	1	
Context 2211, Sample 12/T2		
Agrostemma githago (sf)	1	
Papaver cf. rhoeas/dubium	1	very decayed
Rubus fruticosus agg.	1	
Prunus sp(p). (min s)	2	

Prunus spinosa (ch)	1	
Sambucus nigra	1	
Triticum aestivo-compactum	1	
Avena sp(p).	1	
bone fgts	1	max dim 5 mm
charcoal	1	max dim 20 mm
fish bone	1	max dim 5 mm
fly puparia	1	?mineralised
insect cuticle	1	
root/rootlet fgts	1	

Context 3066, Sample 14/T2

cf. Pisum sativum	1	a single charred cotyledon
Sambucus nigra	1	
charcoal	1	max dim 15 mm
coal	1	max dim 5 mm
mortar	1	max dim 5 mm
root/rootlet fgts (modern)	1	

Context 3084, Sample 16/T2

Cannabis sativa	1	
Urtica dioica	2	
Urtica urens	1	
Polygonum aviculare agg.	1	
Rumex sp(p).	1	
Chenopodium album	1	
Atriplex sp(p).	1	
Stellaria media	1	
Ranunculus Section Ranunculus (ch)	1	very decayed
Fumaria sp(p).	1	
Rubus idaeus	1	
Rubus fruticosus agg.	1	fragment(s) only
Crataegus monogyna	1	very decayed
Crataegus sp./Prunus spinosa (thorns)	1	very decayed
Leguminosae (ch cot)	1	max dim 4 mm
Malva sp(p).	1	
Anthriscus sylvestris	1	very decayed
Aethusa cynapium	1	
Conium maculatum	2	inc fragments
Lamium Section Lamiopsis	1	
cf. Ballota nigra	1	
Stachys sp(p).	1	
Hyoscyamus niger	1	
Sambucus nigra (sf)	1	
Arctium sp(p).	1	fragment(s) only
Sonchus oleraceus	1	
Triticum sp(p).	1	
Triticum aestivo-compactum	1	
cf. Secale cereale	1	a single specimen
Avena sp(p).	1	
Carex sp(p).	1	
bark fgts	1	max dim 20 mm
beetles	1	
bone fgts	1	max dim 10 mm
brick/tile	1	max dim 10 mm
charcoal	1	max dim 20 mm
Cenococcum (sclerotia)	1	
coal	1	max dim 5 mm
concretions	1	max dim 5 mm
earthworm egg caps	1	
Heterodera (cysts)	1	
wood fgts	1	max dim 40 mm

Context 3123, Sample 19/BS

bone fgts	1	max dim 10 mm
charcoal	1	max dim 10 mm
concreted sediment	2	

Context 3221, Sample 17/BS

Corylus avellana (ch roundwood)	1	max dim 10 mm
Quercus sp(p). (charcoal)	1	max dim 10 mm
?hammer scale	1	max dim 2 mm
bone fgts	1	max dim 5 mm
burnt bone fgts	1	max dim 5 mm
charcoal	2	
gravel	2	max dim 25 mm
root/rootlet fgts (modern)	1	

Context 4000, Sample 21/T2

Carex sp(p).	1	
Ficus carica	1	very decayed
Hyoscyamus niger	1	
Lemna sp(p). (fronds)	1	?modern
Polygonum aviculare agg.	1	
bone fgts	2	max dim 5 mm
charcoal	2	max dim 10 mm
cinders	3	max dim 40 mm
coal	2	max dim 30 mm
coal 'char'	1	max dim 10 mm
eggshell fgts	2	max dim 5 mm
fish scale	1	max dim 5 mm
gravel	2	max dim 80 mm
insect cuticle	1	
mortar	1	max dim 30 mm
part-burnt coal	1	max dim 30 mm
root/rootlet fgts (modern)	1	
sand	2	

Context 4118, Sample 22/T2

Cerealia indet.	1	a single specimen
Quercus sp(p). (charcoal)	1	max dim 10 mm
Ranunculus flammula (ch)	1	a single specimen
Salix/Populus sp(p). (charcoal)	1	max dim 10 mm
Triticum sp(p).	1	a single specimen

charcoal	1	max dim 10 mm
cinders	1	max dim 10 mm
coal	1	max dim 10 mm
fish bone	1	max dim 10 mm
fish scale	1	max dim 5 mm
small vertebrate bones	1	max dim 5 mm
snails (inc. *A. nitidula*)	1	
freshwater bivalve (*Pisidium* sp.)	1	

Table 3. Species lists in rank order for invertebrate (other than molluscs) macrofossils from samples from Sprotbrough Hall Gardens.

For each sample assemblage the adult Hemiptera (bugs) and Coleoptera (beetles) are listed first, followed by the remaining invertebrates. Weight is in kilogrammes, n = minimum number of individuals; SQ = semi-quantitative (e = estimate; - = fully quantitative, m = 'many', translated as 15 individuals). For translation of ecological codes, see Table 5. 'null' indicates that there were no recognisable remains of macro-invertebrates, although there may have been decayed scraps unassignable to Class.

Context: 2027 Sample: 1/T2 ReM: S
Weight: 17.00 E: 0.00 F: 0.00

Notes: Entered 22/10/03 HK. Small flot. Plastic sponge, unidentifiable cuticle scraps. Preservation not really recordable, but not good.

Taxon	n	SQ	ec
Staphylininae sp.	1	-	u
?Tipnus unicolor	1	-	rt-ss
Curculionidae sp.	1	-	oa
*Oligochaeta sp. (egg capsule)	1	-	u

Context: 2152 Sample: 11/T2 ReM: S
Weight: 10.00 E: 0.00 F: 0.00

Notes: Entered HK 22/10/03. Small flot, no significant remains.

Taxon	n	SQ	ec
*null	0	-	u

Context: 2211 Sample: 12/T2 ReM: S
Weight: 13.00 E: 0.00 F: 0.00

Notes: Entered HK 22/10/03. Small flot. Clearly modern fly larvae. Preservation not recordable but poor.

Taxon	n	SQ	ec
Anobium ?punctatum	1	-	l-sf
*Diptera sp. (puparium)	28	-	u

Context: 3084 Sample: 16/T2 ReM: S
Weight: 14.00 E: 4.00 F: 3.00

Notes: Entered HK 22/10/03. Small flot but appreciable amounts of insect fragments. Yellowed. E 2.0-4.0, mode 4.0 strong; F 2.0-4.0, mode 3.0 weak; trend to yellow 2-4, mode 4.

Taxon	n	SQ	ec
Cicadellidae sp.	1	-	oa-p
Hydroporinae sp.	1	-	oa-w
Helophorus sp.	1	-	oa-w
Hydrobius fuscipes	1	-	oa-w
Ochthebius ?minimus	1	-	oa-w
Limnebius sp.	1	-	oa-w
Micropeplus fulvus	1	-	rt
Anotylus nitidulus	1	-	rt
Anotylus sculpturatus group	1	-	rt
Stenus sp.	1	-	u
Paederinae sp.	1	-	u
Aleocharinae sp. A	1	-	u
Aleocharinae sp. B	1	-	u
Elateridae sp.	1	-	ob
Monotoma sp.	1	-	rt-sf
Halticinae sp.	1	-	oa-p
Apion sp.	1	-	oa-p
Scolytus sp.	1	-	l
*Cladocera sp. F (ephippium)	100	e	oa-w
*Chironomidae sp. (larva)	15	m	w
*Diptera sp. (puparium)	2	-	u
*Psylloidea sp. (nymph)	1	-	oa-p

Context: 4000 Sample: 21/T2 ReM: D
Weight: 5.00 E: 4.50 F: 3.50

Notes: Entered HK 27/2/04. Tiny flot, orange caste. E 4.0-5.0, mode 4.5 distinct; F 2.5-5.5, mode 3.5 weak; trend to orange 3-4, mode 4 distinct. Identifications limited by preservation.

Taxon	n	SQ	ec
Oryzaephilus surinamensis (Linnaeus)	12	-	g-ss
Omalium ?rivulare (Paykull)	5	-	rt-sf
Tipnus unicolor (Piller and Mitterpacher)	4	-	rt-ss
Anobium punctatum (Degeer)	3	-	l-sf
Xestobium rufovillosum (Degeer)	2	-	l-st
Cercyon sp.	1	-	u
?Catops sp.	1	-	u
Carpelimus ?bilineatus Stephens	1	-	rt-sf
Ptinus sp.	1	-	rd-sf
Aglenus brunneus (Gyllenhal)	1	-	rt-ss
?Hypera punctata (Fabricius)	1	-	oa-p
Sitophilus granarius (Linnaeus)	1	-	g-ss
*Oligochaeta sp. (egg capsule)	1	-	u
*Diptera sp. (puparium)	1	-	u
*Acarina sp.	1	-	u

Table 4. Main statistics for the assemblage of adult beetles from Context 4000, Sample 21 from Sprotbrough Hall Gardens. For explanation of abbreviations, see Table 5.

Context	**4000**
Sample	**21**
Ext	/T2
S	12
N	33
ALPHA	7
SEALPHA	2
SOB	1
PSOB	8
NOB	1
PNOB	3
ALPHAOB	0
SEALPHAOB	0
SW	0
PSW	0
NW	0
PNW	0
ALPHAW	0
SEALPHAW	0
SD	0
PSD	0
ND	0
PND	0
ALPHAD	0
SEALPHAD	0
SP	1
PSP	8
NP	1
PNP	3
ALPHAP	0
SEALPHAP	0
SM	0
PSM	0
NM	0
PNM	0
ALPHAM	0
SEALPHAM	0
SL	2
PSL	17
NL	5
PNL	15
ALPHAL	0
SEALPHAL	0
SRT	5
PSRT	42
NRT	12
PNRT	36
ALPHART	0
SEALPHART	0
SRD	1
PSRD	8
NRD	1
PNRD	3
ALPHARD	0
SEALPHARD	0
SRF	0
PSRF	0
NRF	0
PNRF	0
ALPHARF	0
SEALPHARF	0
SSA	9
PSSA	75
NSA	30
PNSA	91
ALPHASA	4
SEALPHASA	1
SSF	4
PSSF	33
NSF	10
PNSF	30
ALPHASF	0
SEALPHASF	0
SST	1
PSST	8
NST	2
PNST	6
ALPHAST	0
SEALPHAST	0
SSS	4
PSSS	33
NSS	18
PNSS	55
ALPHASS	0
SEALPHASS	0
SG	2
PSG	17
NG	13
PNG	39
ALPHAG	0
SEALPHAG	0

Table 5. Key to ecological codes (lower-case codes in parentheses) assigned to insect taxa and used in Tables 1, 3 and 4. Indivs - individuals (based on MNI); No - number.

No taxa	S	Percentage of RT taxa	PSRT
Estimated number of indivs (MNI)	N	No RT indivs	NRT
Index of diversity ()	ALPHA	Percentage of RT indivs	PNRT
Standard error of ALPHA	SEALPHA	Index of diversity of RT component	ALPHART
No 'certain' outdoor taxa (oa)	SOA	Standard error	SEALPHART
Percentage of 'certain' outdoor taxa	PSOA	No 'dry' decomposer taxa (rd)	SRD
No 'certain' outdoor indivs	NOA	Percentage of RD taxa	PSRD
Percentage of 'certain' outdoor indivs	PNOA	No RD indivs	NRD
No OA and probable outdoor taxa (oa + ob)	SOB	Percentage of RD indivs	PNRD
Percentage of OB taxa	PSOB	Index of diversity of the RD component	ALPHARD
No OB indivs	NOB	Standard error	SEALPHARD
Percentage OB indivs	PNOB	No 'foul' decomposer taxa (rf)	SRF
Index of diversity of the OB component	ALPHAOB	Percentage of RF taxa	PSRF
Standard error	SEALPHAOB	No RF indivs	NRF
No aquatic taxa (w)	SW	Percentage of RF indivs	PNRF
Percentage of aquatic taxa	PSW	Index of diversity of the RF component	ALPHARF
No aquatic indivs	NW	Standard error	SEALPHARF
Percentage of W indivs	PNW	No synanthropic taxa (sf + st + ss)	SSA
Index of diversity of the W component	ALPHAW	Percentage of synanthropic taxa	PSSA
Standard error	SEALPHAW	No synanthropic indivs	NSA
No damp ground/waterside taxa (d)	SD	Percentage of SA indivs	PNSA
Percentage D taxa	PSD	Index of diversity of SA component	ALPHASA
No damp D indivs	ND	Standard error	SEALPHASA
Percentage of D indivs	PND	No facultatively synanthropic taxa	SSF
Index of diversity of the D component	ALPHAD	Percentage of SF taxa	PSSF
Standard error	SEALPHAD	No SF indivs	NSF
No strongly plant-associated taxa (p)	SP	Percentage of SF indivs	PNSF
Percentage of P taxa	PSP	Index of diversity of SF component	ALPHASF
No strongly P indivs	NP	Standard error	SEALPHASF
Percentage of P indivs	PNP	No typical synanthropic taxa	SST
Index of diversity of the P component	ALPHAP	Percentage of ST taxa	PSST
Standard error	SEALPHAP	No ST indivs	NST
No heathland/moorland taxa (m)	SM	Percentage of ST indivs	PNST
Percentage of M taxa	PSM	Index of diversity of ST component	ALPHAST
No M indivs	NM	Standard error	SEALPHAST
Percentage of M indivs	PNM	No strongly synanthropic taxa	SSS
Index of diversity of the M component	ALPHAM	Percentage of SS taxa	PSSS
Standard error	SEALPHAM	No SS indivs	NSS
No wood-associated taxa (l)	SL	Percentage of SS indivs	PNSS
Percentage of L taxa	PSL	Index of diversity of SS component	ALPHASS
No L indivs	NL	Standard error	SEALPHASS
Percentage of L indivs	PNL	No uncoded taxa (u)	SU
Index of diversity of the L component	ALPHAL	Percentage of uncoded indivs	PNU
Standard error	SEALPHAL	No indivs of grain pests (g)	NG
No decomposer taxa (rt + rd + rf)	SRT	Percentage of indivs of grain pests	PNG

Table 6a and b. Measurements (in microns) and descriptive statistics for trichurid eggs from faecal concretions recovered from Sprotbrough Hall Gardens, Context 2211 (Sample 12). Key: p-p = polar plug to polar plug maximum length; w = maximum width.

a)

Context 2211, Sample 12	
w	p-p
24.92	53.57
24.29	56.06
22.43	53.57
22.43	54.82
24.29	52.95
24.92	54.82
24.29	49.21
21.80	54.20
22.43	52.33
24.92	51.08
23.67	52.95
21.80	52.95
23.67	54.82
22.43	49.83
22.43	50.46

b)

Context 2211, Sample 12	w	p-p
Mean	23.38	52.91
Standard Error	0.30	0.52
Median	23.67	52.95
Mode	22.43	54.82
Standard Deviation	1.17	2.00
Sample Variance	1.38	4.02
Kurtosis	-1.71	-0.60
Skewness	0.05	-0.47
Range	3.12	6.85
Minimum	21.80	49.21
Maximum	24.92	56.06
Sum	350.72	793.62
Count	15	15
Confidence Level (95.0%)	0.65	1.11

Fig. 1. Plotted trichurid egg measurements from Sprotbrough Hall Gardens (Context 2211, Sample 12), with overlay of size ranges for eggs of trichurids of several common domesticated animals and Trichuris trichiura. *Maximum length includes polar plugs.*

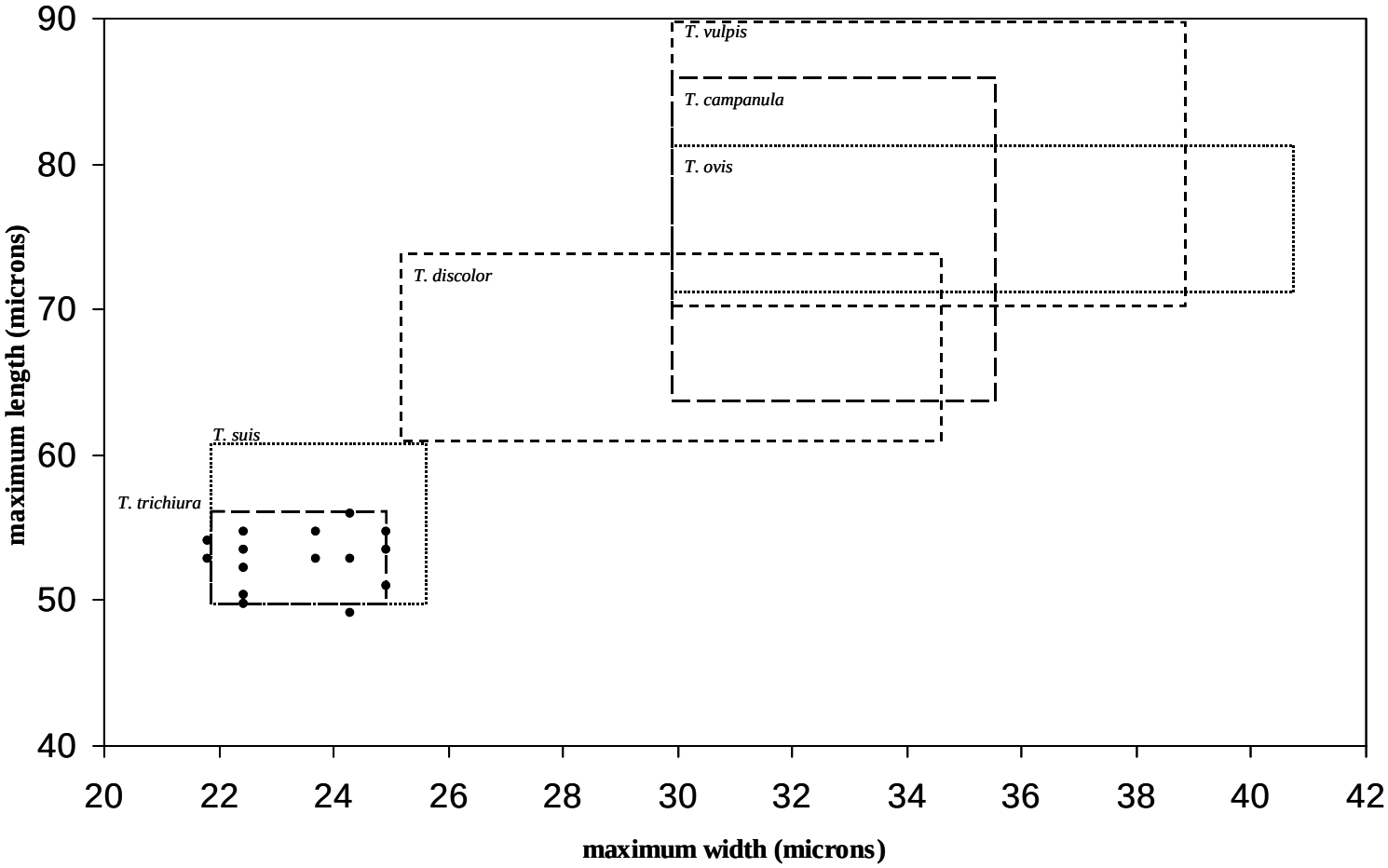

Figure 2. Plotted trichurid egg measurements from Sprotbrough Hall Gardens (Context 2211, Sample 12), with overlay of size ranges for eggs of Trichuris trichiura *and* T. suis. *Error bars are +/- 0.125 of a graticule division or approximately 0.3 of a micron representing the resolution of the measurements.*

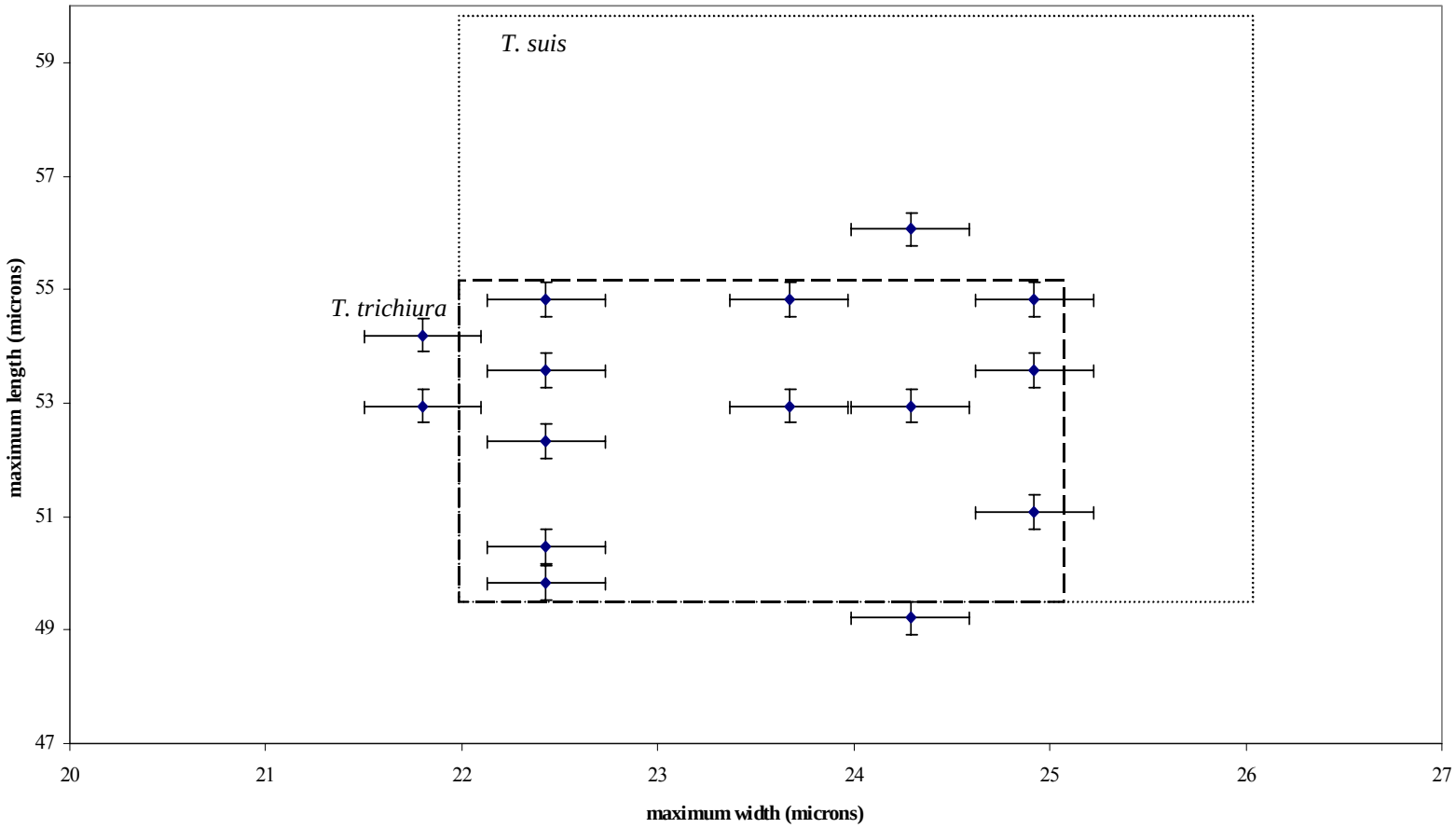

Table 7. Fish remains recovered from the samples from Sprotbrough Hall Gardens.

Phase	Context	Sample	Context type	Frag. count	Preservation	Notes
3	2135	9	Upper fill of pit [2136]	2	Good	Eel: 1 x vertebra Cyprinidae: 1 x precaudal vertebra
3	2152	11	Upper fill of pit recut [2202]	22	Good	Herring: 1 articular, 1 hyomandibular, 1 precaudal vertebra Eel: 10 vertebra, 3 cleithrum Unidentified: 6 including 2 vertebrae (1 burnt)
3	2211	12	Upper fill of cess pit [2212]	126	Fair – somewhat battered	Some of the vertebrae (both herring and eel) are squashed consistent with consumption damage. Eel: 90 x vertebra, 2 x opercular, 1 x cleithrum, 1 x basioccipital, 1 x indet. Herring: 11 x precaudal vertebra, 5 x caudal vertebra Unidentified: 15 fragments
3	3066	14	Fill of ditch recut [3218]	3	Fair	All remains unidentified
4	2027	1	Backfill of well [2026]	20	Fair	Haddock: 1 x premaxilla (from an individual circa 45 cm) Eel: 3 x vertebra, 1 x parasphenoid Cyprinidae: 1 x precaudal vertebra, 1 x indet. Perch: 1 x opercular ?Perch: 1 x precaudal vertebra Unidentified: 12 fragments
4	2144	7	silting of stone culvert	18	Fair	Gadidae: 2 x finray Herring: 2 x caudal vertebra Unidentified: 14 fragments
5	4118	22	dump deposit	37	Good	Cyprinidae: 9 x vertebra (precaudal and caudal), 3 x maxilla, 1 x urohyal, 1 x basipteryigium, 1 x preopercular, 5 x ribs Eel: 2 x vertebra, 1 x articular, 1 x vomer, 1 x cleithrum, 1 x hyomandibular Gadidae: 1 x premaxilla (?haddock)
6	4000	21	dump deposit	24	Good	Perch: 1 x scale Eel: 1 x indet. Unidentified: 22 fish fragments, mostly spine, finray and rib fragments.