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Medieval plant and invertebrate remains principally preserved by anoxic waterlogging at The Brooks, Winchester, Hampshire (site code: BRI and BRII): Technical Report

by

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Summary

A series of samples from cut features of 10th-16th century date at The Brooks site in Winchester, Hampshire (site code BRI and BRII), have been investigated for their content of plant and invertebrate remains. All were found to contain at least some (and generally abundant) evidence for human faecal material preserved by anoxic waterlogging. There were also some fossils preserved by mineral replacement and a very small component of charred plant remains. There were some differences between the samples in their content of food plant remains, with a contrast between the single 10th-11th century sample and those from later features. This difference was also reflected in the insect remains, the earlier cut seemingly having been open to the air and most of the layers in the later ones formed in an enclosed environment. Most layers appeared to have received floor sweepings (which contained 'house fauna' insects, including the remains of human and dog fleas, and in some cases perhaps also plant litter). The great potential for bioarchaeological investigation of at least a proportion of the deposits in the lower-lying parts of Winchester is eloquently demonstrated.

Keywords: THE BROOKS; WINCHESTER; MEDIEVAL; PIT FILLS; WELL FILLS; LATRINES; ANOXIC PRESERVATION; MINERALISED PRESERVATION; CHARRED PRESERVATION; PLANT REMAINS; PARASITE EGGS; INSECT REMAINS

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Introduction

Assessment of samples from The Brooks site, Winchester (Kenward 1994) showed that there were, in addition to charred and mineralised material, abundant plant and invertebrate remains preserved in excellent condition by anoxic waterlogging.

In the light of assessment, six samples of sediment from pit and well fills of 10th-16th century date were submitted by Winchester Museums Service for analysis of insect remains; in addition, remains of plants and intestinal parasites and some other components in the deposits have been examined and are reported here. The results of analysis of a sample examined for insects in an earlier project have also been included.

The archaeological questions addressed in this report relate to local ecology and economic activities in the environs of the site, but particularly to food and living conditions.

The work was necessarily constrained by the very limited funding available, but nevertheless some remarkable results of considerable archaeological importance have been obtained, echoing previous investigations of material from this excavation (notably Groves 1995).

Methods

Practical methods

The six 'GBA' samples (*sensu* Dobney *et al.* 1992) were inspected in the laboratory and a description of their lithology recorded using a standard *pro forma*. Subsamples were taken for extraction of plant and insect macrofossil remains, following procedures of Kenward *et al.* (1980; 1986). Insects were examined in the 'flots' from paraffin flotation, plant remains (and some other components of the deposits) from the wet residues. A sample from Context 11399 had been processed in the EAU by Philippa Tomlinson in the late 1980s and the insect remains from it listed by HK and Enid Allison; the results of the plant analyses, which revealed *inter alia* material identified as rush (*Juncus*) stems and ?leek (*Allium* cf. *porrum*) leaf epidermis, are not currently available.

Plant remains (and other components of the residues) from the six samples examined in 1996 were recorded semi-quantitatively, using a four-point scale of abundance from 1 (one or a few fragments or individuals) to 4 (abundant fragments or individuals, or a major component of the whole deposit).

Parasite eggs were examined by means of 'squashes' (*sensu* Dainton 1992); some other microfossil remains were recorded semi-quantitatively along with these eggs.

Recording methods for insect remains followed those outlined by Kenward (1992). A fully quantitative scan was carried out; the remains of adult beetles and bugs of the groups used for calculating main statistics were all counted, and were identified as far as possible within a reasonable period of time. Invertebrates other than the adults of the beetles and bugs used in calculating 'main statistics' of the assemblages were usually recorded semi-quantitatively using a five-point scale (Kenward *et al.* 1986), abundance for each taxon being estimated as 1, 2, 3, 'several', 'many', or an estimate of a larger number. 'Several' and 'many' are converted to 6 and 15, respectively, for statistical purposes, a conversion discussed by Kenward (1992).

The manuscript lists and notes made during recording of plant and insect macrofossils were entered to Paradox databases. From this, principal statistics and species lists for each assemblage and for the whole site were produced.

Interpretative methods

The interpretative methods employed in this study were essentially as employed in work on a variety of sites by Hall, Kenward and co-workers (see Kenward 1978, with modifications outlined by, for example, Kenward 1982; 1988; Hall and Kenward 1990; and Kenward and Hall 1995).

For the plant remains, interpretation is facilitated by the use of 'abundance-indicator values' (AIVs), calculated from the abundance scores and a score for the indicator value of each taxon within a series of ecological, use, and other groups (for details, see Hall and Kenward 1990). For these samples from The Brooks, the most important groups are FOOS (basic foodplants), QUFA (oak woodland communities) and some of the weed groups (especially SECA, weeds of cornfields)—see discussion below.

For the insect remains, interpretation rests primarily on a number of 'main statistics' of whole assemblages of adult beetles and bugs, and on the recognition of ecologically-related groups of species. The main statistics used include: (a) a measure of species-richness (or diversity), ∀ of Fisher *et al*. (1943), for the whole assemblage and for components of it; and (b) proportions of 'outdoor' species (OB, calculated from taxa coded oa and ob), aquatics (W, w), waterside species (D, d), phytophages (plant-feeders) (P, p), species associated with dead wood (L, l), moorland/heathland taxa (M, m), and decomposers (species associated with decomposing matter of some kind). Decomposers are subdivided into (a) species primarily associated with somewhat dry habitats (RD, rd), (b) those found mostly in rather, to very, foul habitats (RF, rf), and (c) a residuum not easily assignable to one of these (rt). The category 'RT' includes all three of these groups of decomposers (rt+rd+rf). (In each case, the lower-case codes (e.g. 'rd') are those applied to species and the upper-case codes ('RD') are for the ecological group.)

A further ecological component quantified for the present site was the synanthropes, i.e. those species favoured by human activity. Taxa have been assigned codes for degree of synanthropy as follows: 'sf'—facultative synanthrope, common in natural as well as artificial habitats; 'st'—typically synanthropic, but able to live in nature; 'ss'—strong synanthrope, absent from or very rare in natural habitats in the relevant geographical area. These codes give rise to ecological groups SF, ST, and SS, which are summed to give SA (all synanthropes). A group of synanthropes regarded as particularly typical of buildings of various kinds has been termed 'house fauna' (Kenward and Hall 1995).

The quantification of an 'outdoor' component in what are sometimes clearly natural or semi-natural assemblages may not appear entirely logical, but in fact is useful when working with any deposits associated, even if rather indirectly, with human occupation.

The abundance of these 'ecological' groups is discussed against the background of values for many other assemblages from a large number of sites. Thus, % N OB = 30 is a high value, but % N RT = 30 is low; while % N W or % N RF is high at 10.

The index of diversity offers a guide to the presence or absence of remains of insects which bred in or on the developing deposit (autochthones), low values indicating breeding communities, high ones faunas of mixed origins. Note that 'significantly' low values differ for the various components of assemblages; the more inherently rich a component is, the higher the value of the index of diversity for a living community will be. Thus, 'outdoor' communities associated with natural vegetation tend to give a high value of α, while very specialised communities, such as those of decaying matter deposited by humans, or stored grain, have low or very low ones.

Results

A complete list of the plant taxa recorded is given in Table 1 and some statistics relating to the assemblages of plants are presented in Table 2. A complete list of macro-invertebrates is given in Table 3, main statistics of the assemblages of adult beetles and bugs in Table 4, estimates of insect preservational condition in Table 5, and species lists for beetles and bugs and for other macroinvertebrates in Tables 6 and 7

respectively.

Preservation of both plant and invertebrate remains by anoxic 'waterlogging' was generally rather good and in some instances exceptionally so. There was often some preservation of plant and insect remains by mineral replacement. Only one sample (3, Context 10036) yielded insignificant quantities of remains (all of which were mineralised). There were only trivial amounts of charred remains other than small charcoal fragments. The concentrations of invertebrate remains were generally rather high and identifiable plant matter constituted a significant proportion of most of the samples.

The assemblages

Period 8: Late 10th - 11th century

Context 11853 [Pitfill, F1087 - timber-lined pit], **Sample 561/T** (3 kg)

Moist, very dark grey/brown, soft to crumbly (working just plastic), amorphous organic sediment with some mineralization in places. Marine molluscs and ?concretions were present.

That this deposit consisted largely of faecal remains is attested by the abundance of faecal concretions in the large residue, with a very large amount of free 'bran' in the <2 mm fractions and abundant corncockle seed fragments, as well as the eggs of *Trichuris*, the whip-worm (an intestinal parasite). Also abundant were leaf epidermis fragments of *Allium*, probably leek, *A. porrum*, some of which retained a greenish colour, suggesting that the deposits had been anoxic since the moment of formation. The less frequent food remains were apple and strawberry, with traces of cherry, plum/bullace, and blackberry.

This assemblage, lacking any obvious 'exotics' is very typical of cess pit fills from Anglo-Scandinavian Coppergate, York (although records of cherry for pre-Conquest deposits at Coppergate are rare: Kenward and Hall 1995, fig. 191). However, it must be noted that there were occasional seeds of fig and grape amongst material recovered by bulk-sieving of sediment from the same feature and, indeed, the same context (these results will be considered in a later report).

Amongst the other remains were traces of stem of a shrubby plant, probably dyer's greenweed, *Genista tinctoria*, which is most likely to have been used in dyeing. It may have been brought incidentally with cut grassland vegetation, however, for some possible grassland (including hay meadow) plants were present: field scabious (*Knautia arvensis*) and knapweed (*Centaurea* sp., represented by flower head fragments); knotted hedge-parsley (*Torilis nodosa*) may also have arrived with such material. In view of the other evidence these do not appear to represent hay (or stable manure), but their entry route is not clear unless via litter used as a covering on floors.

The considerable number of *Trichuris* eggs recorded from the 'squash' were all well-preserved, with a hue ranging from very pale to very dark; they were complete or nearly so.

An assemblage of 250 individuals (counted) of 71 beetle and bug taxa was accompanied by very large numbers of fly puparia of at least 12 kinds, and a variety of other invertebrates including numerous beetle and syrphid larvae (the latter being 'rat-tailed maggots', the aquatic immature stage of certain hover flies, some very tolerant of anoxic conditions), 13 human fleas (*Pulex irritans*), and several honeybees (*Apis mellifera*).

Whole-assemblage diversity for the adult beetles and bugs was moderately low (alpha = 33.1, SE = 3.3), and outdoor forms rare (% N OB = 3.6); decomposers were quite abundant (% N RT = 64.8) and within this component RD species were important (% N RD = 38.0) and species associated with foul matter very rare (% N RF = 0.8). However, the proportions of decomposers, of RD species, and of synanthropes were substantially lower than in several of the samples from later deposits (Table 4), and the species lists, although having many taxa in common, clearly indicated different conditions. House fauna was represented by *Mycetaea hirta* (47 individuals), *Lathridius minutus* group (14), *Atomaria nigripennis* (12), *Cryptophagus scutellatus* (8), a *Cryptophagus* sp. (7) and *Ptinus fur* (5), as well as by smaller numbers

of some other taxa, and of course the human fleas. If the pit was not located within a building, then clearly floor litter was thrown into it.

Other components were present amongst the insects. There were three species associated with the seeds of vetches, peas, beans and their relatives (a large *Bruchus* sp., probably *rufimanus*, see below, and two smaller *Bruchus* or *Bruchidius* species). The most likely origin of these is in food pulses, and they may have been eaten with peas or beans and voided with faeces. The very fragmentary nature of many of the remains, making identification difficult, may have been a result of chewing, or food preparation. There was no evidence from the plant remains for pulses, but they rarely survive in waterlogged preservation and only sometimes as mineralised or charred fossils. There were, however, rare records of remains of pea (*Pisum)* and field bean (*Vicia faba)* from two contexts for which bulk-sieved subsamples were examined (reported elsewhere).

A third major component was species considered typical of primitive outdoor cess pits (such as those of Anglo-Scandinavian date at 16-22 Coppergate, York, Kenward and Hall 1995). *Philonthus ?politus* (18), *Anotylus rugosus* (12), *Cercyon analis* (8), *Carpelimus bilineatus* (7) and a number of the less abundant taxa fell in this category. This deposit seems to have been accessible to colonising insects as it formed, a conclusion strongly supported by the rich fly fauna, including as it did over 100 puparia of each of *Thoracochaeta zosterae* and two Limosininae species, and smaller numbers of various other taxa associated with foul matter. A further, small, component was associated with dead wood: in addition to the woodworm beetles, there were single specimens of *Lyctus linearis*, *Dropephylla vilis*, *Taphrorychus bicolor* and *Teretrius fabricii*. These perhaps suggest a wider range of types of dead wood than seen in the later phases of the site.

The presence of *T. fabricii* is notable: it is a considerable rarity at the present day, although there are archaeological records from three sites in York: from Anglo-Scandinavian Coppergate (Kenward and Hall 1995), late 2nd century Tanner Row (Hall and Kenward 1990) and the late Roman fills of a well at Skeldergate (Hall *et al.* 1980). *T. fabricii* is a predator of *Lyctus* species, and so has occurred here with its prey. It is apparently mostly recorded from fresh oak palings (Hyman and Parsons 1992), perhaps indicating construction using oak not long before deposition. Importation of these wood-associated insects in moss collected for use on site (as postulated for Anglo-Scandinavian York, Kenward and Hall 1995) seems unlikely in the present case, since no more than traces of woodland mosses were noted and the higher plants which might have originated in woodland were all undoubtedly part of the food component.

In summary, the fill of this pit (as represented by the processed subsample) undoubtedly was of faecal origin, faeces being exposed for long enough for substantial fly populations to develop and for many beetles to colonise. Unless the pit was located within a building, its fills seem to have included floor sweepings.

Period 10: Late 13th - 14th century

Context 10971 [Pitfill, F5300 - latrine], **Sample 45/T** (3 kg)

Moist, very dark grey/brown, soft to plastic, slightly sandy, amorphous organic sediment. Flakes of shale and mortar and some wood fragments were present. The sediment had a slightly granular 'feel'.

There was a very large residue rich in fine organic detritus (about 70% by volume organic), of which a major part was wheat/rye (*Triticum/Secale)* 'bran' in the <1 mm fraction, with abundant seed fragments of corncockle (*Agrostemma githago*), presumably milled with grain and ingested with flour-based foods, and abundant apple (*Malus sylvestris*) endocarp ('core') fragments. Other food plants, present in moderate amounts, included remains of fig (*Ficus carica*), black mulberry (*Morus nigra*), and fennel (*Foeniculum vulgare*), with traces of a range of other taxa, including grape (*Vitis vinifera*), coriander (*Coriandrum sativum*), linseed (*Linum usitatissimum*), plum/bullace (*Prunus domestica* ssp. *insititia*), sloe (*P. spinosa*), cherry (*P.* Section *Cerasus*), hazel

nut (*Corylus avellana*), oat (*Avena*), ?bread wheat (*Triticum* cf. *aestivo-compactum*) and perhaps also black pepper (*Piper nigrum*), bay leaf (*Laurus nobilis*) and gooseberry (*Ribes uva-crispa*), these last three taxa only being tentatively identified. There were also moderate amounts of eggshell and traces of bird and fish bone.

The other particularly significant component in this sample were the remains of fuller's teasel (*Dipsacus sativus*) heads—fragments of capitulum (flower head), receptacular bracts, and fruits were all recorded, the bracts making up a large component of the >2 mm fraction. The heads of fuller's teasel were used extensively in the past for textile finishing (see, for example, Hall 1992 and Ryder 1994). Other plants from this sample potentially associated with textile working were the moderate numbers of seeds of weld (*Reseda luteola*); there were also traces of mineralised textile fragments up to about 5 mm in maximum dimension. Unless they are the last surviving remnants of larger textile fragments, these are too small to have served a sanitary purpose and, with the teasel debris, may have been sweepings from the floor following cloth-working.

The remaining plant taxa included a variety of mosses of essentially woodland habitats, all present in very small amounts; they are taxa regularly recorded in quantity from cess pit deposits at Anglo-Scandinavian York (Kenward and Hall 1995) though their small quantity here does not suggest they were used for sanitary purposes.

A considerable number of *Trichuris* eggs were recorded from the 'squash'; most were very dark and well-preserved and almost all were complete or nearly so.

A substantial assemblage of insect remains, including 193 adult individuals of 51 beetle and bug taxa and a large number of fly puparia, was present in the flot. The beetle and bug fauna was of low diversity (alpha = 23, SE = 3), reflecting the presence of large numbers of several taxa: the most numerous were *Mycetaea hirta* (39 individuals), *Lathridius minutus* group (24), *Anobium punctatum* (the woodworm beetle, 23), *Cryptophagus* sp. (16), *Tipnus unicolor* (13) and *Cryptophagus scutellatus* (7). All of these belong to the 'house fauna' group. Many of the other taxa belonged to this group, or would be able to exploit similar conditions, and its importance in the assemblage was reflected by the very large proportion of 'rd' taxa, preferring relatively dry decomposing matter (% N RD = 60), and the very low diversity of this component (alpha RD = 3.0, SE = 0.5); clearly, they formed a community. Similarly, the highly artificial nature of the habitats giving rise to most of this fauna is indicated by the large proportion of synanthropic forms (% N SA (all synanthropes) = 83; % N SS (strong synanthropes) = 23). Decomposers as a whole (RT) made up 73.1% of the assemblage.

Decomposers associated with foul matter were rare among the beetles (two individuals only, % N RF = 1.0), although the fly puparia indicate wetter conditions (especially the abundant *Thoracochaeta zosterae*, discussed below). *Quedius mesomelinus* (of which there were six) is a semi-subterranean beetle and may have been able to live in the pit or have invaded the deposits after they were sealed, as may the two *Trechus micros*; the subterranean component of archaeological assemblages is discussed by Hall and Kenward (1990, 367-8) and Kenward and Allison (1994).

The abundant woodworms, single powder post beetle (*Lyctus linearis*) and three death watch beetles (*Xestobium rufovillosum*) doubtless infested structural timber or wooden objects within the building; wood-borers such as these would have been an unavoidable component of the household fauna at this period, as they were until the latter half of the 20th century.

It appears likely that almost all of the beetles in this pit came from the building with which it was associated, in floor sweepings or as strays. In the latter case, populations must have been large, or the fauna have been associated with the immediate surroundings of the pit, since the numbers of individuals were so large; they might conceivably have lived on mould growing on, and litter accumulating under, an old-fashioned 'box-shaped' toilet seat, for example. Most of the 'house fauna' beetles are scavengers or mould-feeders, and indicate conditions which were a little damp

and dirty, but perfectly acceptable for human habitation.

The latrine seems to have been located in an enclosed place, with limited ventilation, for foul-matter beetles had not become established or apparently even been attracted in appreciable numbers. The flies were presumably more able to colonise the rather inaccessible fills of the pit than foul-matter beetles, and thus built up substantial populations.

Some 'outdoor' beetles and bugs had been able to gain access (% N OB = 6.7), but these were mostly species likely to have accidentally entered a structure, either in flight (the nettle bug *Heterogaster urticae* may have been searching for a sheltered overwintering spot) or in imported materials. The three individuals of *Lesteva longoelytrata* may reflect this species' highly migratory behaviour (it often flies into modern houses or lands on people in the open), but it is possible that this waterside staphylinid either exploited the edges of the cess pit or was brought in water from a tank or well (if not from the river). It may be able to live under dark damp conditions, for it was abundant in the Roman well at Skeldergate, York (Hall *et al.* 1980), where it must have lived in considerable populations.

The record of a dog flea *Ctenocephalides canis* is notable; it is discussed below.

There is no doubt that the fills of this latrine did, indeed, consist largely of faecal matter. The insects were a mixture of exploiters of foul organic matter with abundant house insects indicating rather damp mouldy conditions (but doubtless normal even in the best houses of the period). The plant remains from this sample are wholly consistent with the 'high status' of the latrine as interpreted on other archaeological evidence (and in this respect contrast quite strongly with the assemblage from the earlier deposit discussed above). The presence of abundant remains of teasel heads is somewhat unexpected, however. Such remains have been recovered from one of a series of early Anglo-Scandinavian cess pits at 16-22 Coppergate, York (Kenward and Hall 1995, 515), but in that case the assumption was that the pits were housed in much more humble and less well-enclosed structures (if, indeed, they were not in the open air) and that they received a variety of refuse as well as faeces.

It may be significant that this sample contained moderate amounts of slate, presumably an expensive roofing material in the chalklands of Southern England at this period.

Context 11393 [Pitfill, F5300 - latrine], **Sample 57/T** (3 kg)

Moist to wet, very dark grey/brown, soft to plastic (working plastic), slightly sandy amorphous organic sediment. Wood fragments and flecks of mortar were present. The sediment had a slightly granular 'feel'.

The moderately large residue was rich in fine debris, both organic and mineral (there was abundant sand-grade chalk); preservation by anoxic 'waterlogging' was noted as being very good, and there was also a very characteristic form of mineral deposition in the form of tubular fragments with smooth interior walls and tubercular outer surfaces, apparently formed around tubular stems (a likely candidate for these would be rush, *Juncus*, stems). Much of the identifiable plant material again consisted of food remains: fig seeds were abundant, with moderate numbers of fennel, apple and strawberry remains. Also present were traces of coriander, black mulberry, hazel nut, cherry, and grape, with leaf epidermis of *Allium* (again, probably leek) and a tentatively identified parsley (*Petroselinum crispum*) seed.

There were considerable numbers of *Trichuris* and a trace of *Ascaris* (roundworm) eggs in the 'squash'; most were dark-coloured and well-preserved, being complete or nearly so.

Insects were extremely abundant, with fragments of in excess of 500 pupae (probably dipterous), over 100 puparia, and 487 individuals of 69 beetle taxa. Diversity of the beetle fauna was low (alpha = 22, SE = 1.7) and outdoor forms rare (% N OB = 3.5). Decomposers (RT) accounted for 86.4% of the assemblage, with RD forms abundant (% N RD = 67.8) and those associated with foul matter very rare (% N RF = 0.8). Most of the more abundant species fell in the house fauna

category, and synanthropes, including obligate or near-obligate forms, accounted for a very large part of the beetle assemblage (% N SA = 83.4; % N SS = 37.0). There were huge numbers of *Mycetaea hirta* (152 individuals), associated with somewhat damp, mouldy conditions; the other abundant taxa included a *Cryptophagus* species (60), *Lathridius minutu*s group (46), *Tipnus unicolor* (25), *Anobium punctatum* (21), *Atomaria nigripennis* (19), *Xylodromus concinnus* (15), *Cryptophagus scutellatus* (12) and *Ptinus fur* (8).

This could be said to be almost a 'type example' for house fauna assemblages, and somewhat damp decaying plant remains—litter or wood—with moulds must have been abundant. The possibility that floor sweepings were incorporated into this deposit seems greater in view of the presence of six human fleas (*Pulex irritans*) and four dog fleas (*Ctenocephalides canis*).

Structural wood was probably invaded by the woodworm (21 individuals), powder post (5) and death watch (1) beetles. The record of *Opilo mollis* is of considerable interest, for this rather rare beetle ('Notable B' according to Hyman and Parsons 1992) is predatory on wood-boring beetles of the family Anobiidae, to which the woodworm and death watch beetles belong.

Outdoor forms were, apart from two *Sitona* sp., all represented by single individuals in this assemblage. They probably were strays of various kinds—i.e. 'background fauna'. *Sitona* species often find their way into modern houses but also sometimes occur on peas and beans.

A noteworthy component was a group suspected to have subterranean tendencies: *Quedius mesomelinus* (of which there were 34), *Coprophilus striatulus* (13), *Trechus micros* (5), and perhaps *Aglenus brunneus* (1). They may have lived in dark, dank conditions in the pit, have floundered into wet fills and become trapped, or have invaded post-depositionally. If the last was the case, the fill must have been somewhat open-textured at some stage, perhaps accounting for the degree of decay observed in the plant remains (see below).

In summary, the plant remains from this deposit were, perhaps not surprisingly, very similar to those from the sample from 10971 (nearly half of the food taxa were common to both assemblages). The more unusual plants—pepper, bay laurel and gooseberry, tentatively identified from 10971— were not present, though it must be remarked that the quantity of plant remains preserved by 'waterlogging' in 11393 was smaller and their quality of preservation poorer than in the subsample from 10971. The unusual 'tubular' mineral-replaced structures, which were probably rush stems, are most likely to be from floor sweepings, rushes being a traditional floor covering. The insect remains, too, were closely similar to those from Context 10971, with essentially identical implications.

Context 11399, Sample 11399 [presumed to come from the same feature as 10971 and 11393]

The insect remains from this sample were recorded by E. P. Allison and HK in the late 1980s; the data are included here as they are only otherwise available as archive.

A substantial group of beetles was recovered (251 individuals of 39 species), but few other remains were recorded. Fly puparia were not listed as a component of this assemblage, but they may have been recorded separately from the other insects. In general, the remarks concerning the main components of Sample 57 from Context 11393 apply to this assemblage too, and most of the statistics describing the two assemblages are probably not significantly different. Again, there were several human fleas. Whole-assemblage diversity was notably low, however, indicating that a very restricted range of habitats contributed to the fauna.

Period 11: 14th - 15th century

Context 11082 [Well fill, F5013 - ashlar-lined tank converted to well], **Sample 48/T** (3 kg)

Wet, mid grey/brown, plastic and sticky, sandy, silty clay. Rotted mortar and pottery fragments were present.

There was a large residue, about 30% by volume organic matter. Concretions formed a large part of the 'mineral' component, together with some chalk and flint gravel.

Food remains were clearly important in this deposit, since there were abundant fig seeds and wheat/rye bran fragments, with moderate numbers of strawberry (*Fragaria*) seeds and eggshell membrane fragments. Corncockle seed fragments were again rather frequent. Other food plants, present in small amounts, included coriander, fennel, apple, sloe, blackberry (*Rubus fruticosus*), raspberry (*R. idaeus*), and grape, with hazel nut and also walnut (*Juglans regia*). There were few other taxa and no other ecological or use group was well enough represented to be worthy of comment.

There were moderate numbers of *Trichuris* eggs, all dark in colour but rather poorly preserved (only a few were complete or nearly so).

Insects were fairly numerous, with several tens of fly puparia and 154 individuals of 44 beetle and bug taxa. A large proportion of the beetles and bugs belonged to decomposer communities (% N RT = 81.8), as did the fly puparia, *Thoracochaeta zosterae* in particular indicating foul conditions. 'Dry' decomposers accounted for much of the beetle fauna (% N RD = 68.8), and most of these belonged to the 'house fauna' group; synanthropes were predominant (% N SA = 84.4; % N ST = 54.5). The most numerous beetles were the spider beetle *Tipnus unicolor* (54 individuals), *Lathridius minutus* group (24), a *Cryptophagus* species (15), *Mycetaea hirta* (5) and *Anobium punctatum* (4). Much of the rest of the fauna would have exploited similar habitats to these, or have been strays of various origins. The similarity to the fauna from pitfill Context 10971 was close, and this extended to the presence of the same group of domestic wood-boring beetles.

This deposit clearly contained faecal material, probably human, but on the evidence from the insects also had a strong domestic influence. The fauna does not appear to have entered during its phase of use as a well, and is more likely to indicate the dumping of refuse from within a building.

Context 11202 [Well fill, F5013 - ashlar-lined tank converted to well], **Sample 47/T** (1 kg)

Just moist, mid-dark grey, stiff (working plastic), slightly sandy clay silt with stones present in the size range 2-60 mm. Mortar flecks and wood fragments were also present.

Though food remains formed a major part of the organic component deposit (which itself formed about 10% by volume of the residue), there were no 'exotic' taxa apart from a trace of fig seeds. The most abundant remains were apple, wheat/rye bran, blackberry and elderberry (*Sambucus nigra*), with moderate amounts of corncockle seed fragments as a contaminant of the flour from which the bran derived. Probable food plants present in trace amounts included sloe, ?opium poppy (*Papaver* cf. *somniferum*), hazel nut, oats, and raspberry. Of the remaining taxa, only stinging nettle (*Urtica dioica*) was present in more than very small amounts but no group was particularly well represented. Much of the residue consisted of chalk and flint gravel to 30 mm.

Although no subsample of this sample was examined specifically for parasite eggs, well-preserved *Trichuris* eggs were noted in a 'smear' made from a small clast of undisaggregated sediment during examination of the residue for plant remains.

Rather few insect remains were recovered from the processed subsample, including 38 individuals of adult Coleoptera and Hemiptera and a few tens of fly puparia. Among the latter, *Thoracochaeta zosterae* (23 puparia) and *?Scatopse notata* (5) were identified and indicate rather to very foul conditions. House fauna and some generalised decomposers made up a substantial part of the beetle assemblage, but their means of entry to the deposit, and thus their significance, is not clear. The decomposer group was of higher diversity than others from the site (alpha RT = 18.8, compared with a site mean of 11.6 and a mean excluding Sample 47 of 9.63), an indication of mixed origins. The proportion of 'outdoor' forms was higher than for the remaining samples examined from the site (although not high compared with values for many other occupation deposits), and probably indicates some exposure to the open

air, as does the high value for the index of diversity for the assemblage (alpha = 64.8, but SE = 24.6).

Again, this fill included a component of faecal material. The concentration of beetle remains was considerably lower than in the other sample from this feature and had distinctly different characteristics. The material may have been exposed to the open air during deposition, or have incorporated detritus from an open surface—if the latter, there is no evidence for an established weed flora other than perhaps some stinging nettles.

Period 11: 15th - 16th century

Context 10036 [Pitfill, F1000 - base of dovecote?], **Sample 3/T** (1 kg)

Moist, light grey/brown to yellowish, crumbly (working plastic), sandy silty clay. Chalk fragments were abundant at the 1 mm scale and present at the 6-20 mm scale, while flint was present in fragments up to 10 mm.

The very small flot contained only a little plant detritus and some grains of sand. No invertebrates were present. The moderate-sized residue of about 400 cm^3 consisted mainly of slate (to 20 mm) and chalk gravel (to 25 mm) with a few fragments of very degraded faecal concretions (to 25 mm). A single mineral-replaced corncockle seed was noted and one mineral-replaced *Prunus* seed, along with a little fish bone (some of it distorted, presumably by mastication), mineralised fly puparia and some herbaceous stem fragments. A representative selection of the puparia all proved to be *Thoracochaeta zosterae*, indicative of foul conditions. A fragment of concretion disaggregated in dilute hydrochloric acid gave abundant *Trichuris* eggs, all of them rather pale; they ranged in completeness from entire to just identifiable. More than half were complete or nearly so.

Although this sample gave only very limited evidence for plant and invertebrate remains, it undoubtedly contained faeces, presumably human.

Discussion

All of the deposits examined during the current exercise proved to contain (and in some cases to consist largely of) faecal matter; there is every reason to assume that it is human. All of the cuts thus served as latrines at some stage, though only some were so interpreted during excavation. The evidence from plant remains indicates the nature of at least part of the food base of the inhabitants of the site at the various periods represented by these deposits, with some noteworthy differences between assemblages. Thus the earliest deposit (11853) contained only traces (from BS samples) of 'exotic' taxa, the vast majority of the fruits being likely to have been collected locally, whilst the samples from the later, 'high status' latrine (contexts 10971 and 11082) gave a variety of plants which are most likely to have been imported, or which at any rate could not be collected from native, wild-growing plants—fig, grape, mulberry, and perhaps the flavourings pepper and bay leaf. The food plants from the later medieval well fills (11082 and 11202) contain some of these exotics but are a much less diverse group.

Other plant remains observed were primarily weeds, mainly cornfield taxa likely to have arrived in cereal-based foods; indeed, corncockle seed fragments were often abundant and these are of considerable significance since milled corncockle seeds would have contributed a potentially poisonous component to the food intake (Knörzer 1967; Wilson 1975; Kenward and Hall 1995, 758). It is interesting that corncockle seed fragments made up a very large proportion of the earliest deposit (11853) but were also very common in the richer of the two assemblages from the 'high status' latrine fill (10971). The presence of corncockle seed fragments in deposits containing 'bran' is, in the authors' experience, more or less universal for the medieval period and points to a serious and apparently unsolved problem of grain cleaning; the seeds of *Agrostemma* are too close in size to cereal grains to remove by winnowing or sieving. (As an aside, it would be interesting to establish whether seed size in corncockle has converged with that of cereals as a result of selection during grain cleaning over the millennia.)

The presence of abundant remains of teasel 'heads' and fruits in the sample from 10971 is unusual (though a precedent from Anglo-Scandinavian Coppergate, York, has already been mentioned). Given the presence of moderate numbers of weld seeds in the same sample, it is tempting to point to this as evidence of textile working activity, though both weld and teasel might be part of the weed flora of abandoned ground or even garden soil, the former especially favoured by calcareous soils. The only other possible evidence for dyeing is the tentatively identified dyer's greenweed stem material from the sample from 11853. This plant has been recorded consistently from Anglo-Scandinavian deposits in York (although there are several records from deposits of later date from York and elsewhere: Hall, forthcoming).

The fly puparia and a varying proportion of the beetles from these samples are consonant with with foul deposits, but generally speaking only the former appear to have established substantial populations, perhaps because most of the deposits were well protected (presumably within buildings). The principal indicators of foul conditions in these deposits were the abundant puparia of *Thoracochaeta zosterae*. Although this fly is generally found in decaying seaweed on the shore at the present day, it seems to have been a characteristic species of foul organic accumulations in the past; an outline of its biology and principal references are given by Kenward and Hall 1995, 747). Only the sample from the earliest of the features (from Context 11853) indicated the development of a substantial beetle fauna *in situ*, and in this case there was a striking resemblance to some of the Anglo-Scandinavian (Kenward and Hall 1995) and early post-Conquest pit fills from Coppergate, York. Perhaps this pit was unprotected or only lightly screened.

Most of the assemblages of beetles were dominated by house fauna (as defined by Hall and Kenward 1990 and Kenward and Hall 1995). There is no reason to suspect that these insects bred in any of the cuts, and they must have originated within the buildings with which they were associated. It is just possible that the house fauna species fell into wet pit fills by accident and were trapped, but it seems very much more likely that they were introduced in floor sweepings, which would have been conveniently disposed of in the latrine, serving to cover its contents at intervals, yet not being so bulky as to shorten its life by rapid filling. If the insects entered accidentally, they only define conditions within the room housing the 'latrines', which might predictably be rather moist and might even house birds' nests and other organic accumulations colonised by insects. If the fauna entered with floor sweepings from other rooms, then they carry the implication that the building as a whole may have been somewhat damp, perhaps not surprising in view of their location close to the River Itchen.

Structural wood was probably invaded by the woodworm, powder post and death watch beetles, the first of these having built up large populations. As at other urban sites of Roman to post-medieval date, the abundance of woodworm is somewhat at odds with the claim by Hickin (1975, 55) that the increasing abundance of woodworm was a mid-20th century phenomenon.

The dog and human fleas *Ctenocephalides canis* and *Pulex irritans* were doubtless common domestic pests. *P. irritans* is a regular component of assemblages from archaeological deposits associated with houses, but *C. canis* has been recorded rather more rarely, and the present record seems to be the only occasion when more than single individuals have been noted. The larvae of both species develop in litter such as that found in cracks in floorboards. It appears that the household making use of F5300, at least, allowed dogs indoors. The lack of records of cat fleas from archaeological deposits noted elsewhere (Allison and Kenward 1990) remains surprising in view of the enormous populations which may develop in modern houses.

The presence, sometimes in large numbers, of the spider beetle *Tipnus unicolor*, in most of these deposits is notable, although not surprising. It is becoming apparent that it was one of the most typical insects of later medieval and post-medieval buildings, as well as in some Roman ones. Presumed to be a slow coloniser, it appears to be an indicator of long-standing occupation, and perhaps usually of long-lived structures. Its rarity in the

Anglo-Scandinavian to early medieval periods has been remarked upon elsewhere (Kenward and Allison 1994; Kenward and Hall 1995, 761-2; Kenward *et al*. 1995), and it is notable that this easily-recognised species is absent from the only sample of this period from the present site (that from Context 11853)! Grain pests, too, are rarely recorded from the 5th to 11th centuries, but single specimens of *Oryzaephilus surinamensis* (saw-toothed grain beetle) and *Sitophilus granarius* (grain weevil) were present in 11853, observations in accord with the records of small quantities of exotic foodplants from bulk-sieved samples (see above). The socio-economic changes postulated to have brought about the post-Norman resurgence of grain pests may therefore have begun to take effect by this stage. Grain pests were occasionally present in small numbers in the later phases at The Brooks, too, but never developed large populations. This may reflect the limited range of material entering the cuts; the grain pests recorded from most Roman and later medieval sites almost certainly originate from stable manure rather than stores of grain for human use (Kenward and Hall 1996).

The three species of Bruchidae ('pean and bean weevils') recorded from the site (principally from Context 11853) were represented by very fragmentary or worn remains. These beetles are difficult to identify with certainty even from fossil material in good condition, but the most numerous species was most likely to have been *Bruchus rifimanus*, repeatedly recorded from archaeological deposits and in particular from cess pits. These bruchids probably originated in pulses used for food, perhaps having been eaten and voided with faeces. The fragmentary nature of the remains may have been a result of chewing or grinding during food preparation.

The honeybees recorded from Context 11853 may have been strays or have originated via honeycomb or poorly-filtered honey which had been eaten; they were not sufficiently abundant to indicate that hives were kept on the site.

Concluding remarks

The observations of both the plant and insect remains from these deposits at The Brooks fit well into a gradually emerging pattern of urban change seen in other towns, notably York. Although only a few samples have been examined and only one was of Saxon date, the contrast between the earlier and later material is quite striking. This theme will require elaboration when the data from the various studies of biological remains are drawn together.

Winchester, like some other towns, has sometimes been assumed to be unpromising as a source of evidence from biological remains preserved by anoxic waterlogging—in this case because the town is largely built on chalk slopes—even though it was the subject of some of the earliest work on such material (Dickson 1973, 231; Pike and Biddle 1966; Taylor 1955). It is clear that local preservation in cut features, at least, does occur, and may be widespread (the authors are of the opinion that, if looked for systematically, at least some waterlogged preservation can be found at a surprisingly large proportion of sites, especially urban ones, throughout North-West Europe). The Brooks area, close to the canalised River Itchen and doubtless with a high water-table, may be unusual in the town, but is part of a quite extensive low-lying area which should be afforded special attention in future excavations. It is also desirable that as many as possible of the samples from The Brooks should be examined; the present exercise has been severely limited by funding, and much more could—and in view of the superb nature of the material discussed here, should—be done.

Retention and disposal

The samples should be retained for at least three years after publication to allow for further investigation; selected ones should be retained in the long term as a research resource. Flots and residues from analysis should also be retained in the longer term.

Archive

All extracted fossils and flots are currently stored in the Environmental Archaeology Unit, University of York, along with paper

and electronic records pertaining to the work described here.

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Table 1. List of plant taxa (and some other components) recorded from deposits at The Brooks, Winchester. Taxonomy and nomenclature follow Smith (1978) for mosses, and Tutin et al. *(1964-80) for vascular plants. The figures in the table are abundance scores on a four-point scale (see text for explanation). Items recorded from Sample 3, Context 10036 are listed separately, below. Abbreviations: min—'mineralised', i.e. partly or wholly mineral-replaced; fgts—fragments. Plants likely to have been used as food are marked '*'.*

		Context	10971	11082	11202	11393	11853
		Sample	45	48	47	57	561
Taxon	Common name	Parts recorded					
Mosses							
Dicranum sp(p).		leaf/leaves and/or shoot fragment(s)	1	-	-	-	-
Neckera complanata (Hedw.) Hüb.		leaf/leaves and/or shoot fragment(s)	1	1	-	-	-
Thuidium tamariscinum (Hedw.) Br. Eur.		leaf/leaves and/or shoot fragment(s)	1	-	-	-	-
Thuidium sp(p).		leaf/leaves and/or shoot fragment(s)	-	1	-	-	-
Scorpidium scorpioides (Hedw.) Limpr.		leaf/leaves and/or shoot fragment(s)	-	-	1	-	-
Calliergon cuspidatum (Hedw.) Kindb.		leaf/leaves and/or shoot fragment(s)	-	-	-	-	1
Isothecium myurum Brid.		leaf/leaves and/or shoot fragment(s)	1	-	-	-	-
I. myosuroides Brid.		leaf/leaves and/or shoot fragment(s)	1	-	-	-	1
Homalothecium sericeum/lutescens		leaf/leaves and/or shoot fragment(s)	1	-	-	-	-
Eurhynchium praelongum (Hedw.) Br. Eur.		leaf/leaves and/or shoot fragment(s)	1	-	-	-	-
Vascular plants							
Filicales	fern	pinnule fragment(s)	1	-	-	-	-
Salix sp(p).	willow	bud(s)	-	-	1	-	-
**Juglans regia* L.	walnut	nutshell fragment(s)	-	1	-	-	-
**Corylus avellana* L.	hazel	nut(s) and/or nutshell fragment(s)	1	1	1	1	-
Fagus sylvatica L.	beech	bud(s) and/or bud-scale(s)	1	-	-	-	-
Quercus sp(p).	oak	bud(s) and/or bud-scale(s)	1	1	-	-	-
cf. *Quercus* sp(p).	?oak(s)	charred bud and/or bud-scales	-	1	-	-	-
**Morus nigra* L.	black mulberry	seed(s)	2	-	-	1	-
**Ficus carica* L.	fig	seed(s)	2	3	1	3	-
Urtica dioica L.	stinging nettle	achene(s)	-	-	2	-	-
Bilderdykia convolvulus (L.) Dumort.	black bindweed	fruit fragment(s)	-	-	-	-	1

		Context	10971	11082	11202	11393	11853
		Sample	45	48	47	57	561
Taxon	Common name	Parts recorded					
Rumex sp(p).	docks	fruit(s)	1	-	-	-	-
Atriplex sp(p).	oraches	seed(s)	1	-	-	-	-
Stellaria media (L.) Vill.	chickweed	seed(s)	-	-	1	-	-
Agrostemma githago L.	corncockle	seed fragment(s)	3	2	2	1	4
Silene cf. *vulgaris* (Moench) Garcke	?bladder campion	seed(s)	-	1	-	-	-
Ranunculus Section *Ranunculus*	meadow/creeping/bulbous buttercup	achene(s)	1	-	1	1	1
*cf. *Laurus nobilis* L.	?bay laurel	leaf fragment(s)	1	-	-	-	-
**Papaver* cf. *somniferum* L.	?opium poppy	seed(s)	-	-	1	-	-
**Brassica* sp(p).	cabbages, etc.	seed fragment(s)	-	-	-	1	-
*cf. *Brassica* sp(p).	?cabbages, etc.	pod fragment(s)	1	-	-	-	1
Brassica sp./*Sinapis arvensis*	brassica/charlock	mineralised seed(s)	-	-	1	-	-
		seed fragment(s)	-	-	1	-	-
		seed(s)	1	-	-	-	-
*cf. *Raphanus* sp(p).	?radishes	seed fragment(s)	-	-	1	-	-
Raphanus raphanistrum L.	wild radish	pod segments and/or fragment(s)	1	-	-	-	1
Reseda luteola L.	weld/dyer's rocket	seed(s)	2	-	-	-	-
*cf. *Ribes uva-crispa* L.	?gooseberry	seed(s)	1	-	-	-	-
**Rubus idaeus* L.	raspberry	seed(s)	-	1	1	-	-
**R. fruticosus* agg.	blackberry/bramble	seed(s)	-	1	2	-	1
Potentilla sp(p).	cinquefoils, etc.	achene(s)	-	-	1	-	-
**Fragaria* sp(p).	strawberry	achene(s)	-	2	-	2	2
**Malus sylvestris* Miller	crab apple	endocarp	3	1	2	2	2
		limpet-shaped structure(s) at seed base	1	1	-	-	-
		seed(s)	2	-	1	1	1
**Prunus spinosa* L.	sloe	fruitstone(s)	1	1	1	-	-
**P. domestica* ssp. *insititia* (L.) C. K. Schneider	plums, etc.	fruitstone(s)	1	-	-	-	1
Leguminosae	pea family	flower(s) and/or petal(s)	-	-	-	-	1
cf. *Genista tinctoria* L.	?dyer's greenweed	stem fragment(s)	-	-	-	-	1

		Context	10971	11082	11202	11393	11853
		Sample	45	48	47	57	561
Taxon	Common name	Parts recorded					
**Linum usitatissimum* L.	cultivated flax	seed(s)	1	-	-	-	-
**Vitis vinifera* L.	grape	seed(s)	1	1	-	1	-
Scandix pecten-veneris L.	shepherd's needle	mericarp(s)	1	-	-	-	-
**Coriandrum sativum* L.	coriander	mericarp fragment(s)	1	1	-	1	-
**Foeniculum vulgare* Miller	fennel	mericarp(s)	2	1	-	2	-
Bupleurum rotundifolium L.	hare's-ear/thorow-wax	mericarp(s)	1	-	-	-	1
*cf. *Petroselinum crispum* (Miller) A. W. Hill	?garden parsley	mericarp(s)	-	-	-	1	-
Torilis japonica (Houtt.) DC.	upright hedge-parsley	mericarp(s)	-	-	-	-	1
Solanum nigrum L.	black nightshade	seed(s)	-	1	-	-	-
**Sambucus nigra* L.	elder	seed(s)	-	-	2	-	-
Valerianella dentata (L.) Pollich	narrow-fruited cornsalad	fruit(s)	-	-	1	-	-
Dipsacus sativus (L.) Honckeny	fuller's teasel	capitulum fragment(s)	2	-	-	-	-
		fruits(s)	1	-	-	-	-
		receptacular bract(s)	3	-	-	-	-
Dipsacus sp(p).	teasels	fruits(s)	2	1	-	-	-
Knautia arvensis (L.) Coulter	field scabious	fruit fragment(s)	2	1	-	1	1
Carduus/Cirsium sp(p).	thistles	achene(s)	1	-	-	-	-
Centaurea sp(p).	knapweeds, etc.	achene fragment(s)	1	-	-	-	-
		involucral bract(s)	1	-	-	-	1
Leontodon sp(p).	hawkbits	achene(s)	1	-	-	-	-
Lapsana communis L.	nipplewort	achene(s)	1	-	-	-	-
**Allium* sp(p).	onions, etc.	leaf epidermis fragment(s)	-	-	-	1	3
Gramineae/Cerealia	grasses/cereals	charred culm node(s)	1	-	-	-	-
Gramineae/Cerealia	grasses/cereals	culm node(s)	2	-	-	-	-
*Cerealia indet.	cereals	charred caryopsis/es	-	-	-	-	1
**Triticum* cf. *aestivo-compactum*	?bread/club wheat	charred caryopsis/es	1	-	-	-	-
**Triticum/Secale*	wheat/rye	waterlogged periderm ('bran') fragments	4	3	2	-	4

		Context	10971	11082	11202	11393	11853
		Sample	45	48	47	57	561
Taxon	Common name	Parts recorded					
*cf. *Hordeum* sp(p).	?barley	charred caryopsis/es	1	-	-	-	-
**Avena* sp(p).	oats	charred caryopsis/es	1	-	1	-	-
Carex sp(p).	sedges	nutlet(s)	-	1	1	1	1
Other components							
		Alnus (charcoal)	1	-	-	-	-
		Corylus (wood)	1	-	-	-	-
		Pinus (wood)	-	-	-	1	-
		Quercus (wood)	1	-	-	-	-
		Trichuris (eggs)	-	-	1	-	1
		bark fgts	-	-	-	1	-
		bast fgts	1	-	-	-	-
		bird bone	1	-	-	-	-
		bone fgts	-	-	1	1	-
		chalk ‘sand’	-	-		3	3
		chalk gravel	1	2	1	2	2
		charcoal	1	1	1	2	1
		concretions	1	-	1	-	-
		earthworm egg caps	-	-	1	-	-
		earthworm egg caps (min)	1	-	-	-	-
		eggshell fgts	2	-	-	-	-
		eggshell membrane fgts	1	2	-	1	1
		faecal concretions	-	3	-	-	4
		fish bone	1	1	-	1	2
		flint gravel	1	1	3	-	-
		fly pupae	-	-	-	2	-
		fly puparia	1	1	1	1	2

		Context	10971	11082	11202	11393	11853
		Sample	45	48	47	57	561
Taxon	Common name	Parts recorded					
		mammal bone	-	-	-	-	1
		mortar	1	-	-	-	-
		?mortar	-	-	-	1	-
		moss	-	-	1	-	-
		oyster shell fgts	-	-	1	-	1
		root/rootlet fgts	-	-	1	-	-
		slate	2	-	-	-	-
		stem fgts (min)	-	-	-	3	-
		textile fgts (min)	1	-	-	1	-
		twig fgts	1	-	1	-	-
		wood fgts	1	1	1	-	1

List of remains recorded from the residue from a subsample of Sample 3, Context 10036. An identification for the fly puparia is given in Table 7.

Agrostemma githago (min)	1
Prunus sp. (min seed)	1
?bird bone	1
chalk gravel	2
charcoal	1
faecal concretions	1
fish bone	1
flint gravel	1
fly puparia (min)	1
sand	1
slate	2
stem fgts (min)	1

Table 2. Numbers of taxa and abundance-indicator values (AIVs) for various ecological and use groups for plant taxa from the samples from The Brooks, Winchester (excluding Sample 3, Context 10036). The groups are listed at the end of the table. N.B. 'Number of taxa' includes separate parts of plants, e.g. endocarp and seeds of apple are recorded as two taxa.

Context	10971	11082	11202	11393	11853
Sample	45	48	47	57	561
No. identifiable taxa	51	23	23	17	23
Edaphics					
CALC	6	-	-	-	-
Mosses					
BOGS	-	-	2	-	-
DUNS	2	-	-	-	-
FENS	-	-	2	-	2
GRAS	-	-	-	-	2
LIGN	12	2	-	-	2
MARS	2	-	2	-	2
OLIT	2	-	-	-	-
SLIT	12	2	-	-	2
SOIL	2	-	-	-	-
WOOF	6	2	-	-	-
Useful					
DYES	6	-	-	-	1
FIBR	3	-	-	-	-
FOOF	12	6	1	10	-
FOOO	3	1	1	-	-
FOOS	66	44	40	33	36
HERB	-	-	-	-	1
USEF	21	-	-	-	-
WOOD	1	2	1	-	-
Vegetation					
ALNE	-	-	4	-	-
ARTE	35	7	9	3	5
BIDE	2	-	2	-	-
CAKI	2	-	-	-	-
CHEN	11	3	4	3	5
EPIL	-	2	6	-	-
FEBR	8	4	2	5	6
MOAR	6	2	2	4	7
NACA	-	2	4	-	2
PHRA	1	-	1	1	1
QUER	1	2	-	-	
QUFA	18	9	20	8	8
RHPR	8	6	18	2	4
SECA	20	8	12	4	21
TRGE	-	1	-	-	1

Explanation of group codes

CALC	plants with distinctly calcicole preferences
BOGS	mosses of peat bogs
DUNS	mosses of dunes and dune slacks
FENS	mosses of fens and carr
GRAS	mosses of grassland
LIGN	mosses growing on tree bark/dead wood
MARS	mosses of marshes
OLIT	mosses of unshaded rocks
SLIT	mosses of shaded rocks
SOIL	mosses growing on soil
WOOF	mosses of woodland floors
DYES	plants certainly or probably used in dyeing
FIBR	plants certainly or probably used as a source of fibre
FOOF	plants used as flavourings (including herbs, spices)
FOOO	plants certainly or probably used for oil
FOOS	primary food plants
HERB	plants certainly or probably used medicinally
USEF	plants useful in some way other than for food, fibre, oil, dyeing, medicine or as ornamentals
WOOD	plants likely to have originated with brushwood or timber
ALNE	plants of alder carr
ARTE	plants of biennial and perennial nitrophilous tall-herb weed communities of waste places, river-banks, waysides and hedgerows
BIDE	plants of nitrophilous weed communities of pond edges, ditches and other places subject to periodic inundation
CAKI	plants of nitrophilous weedy communities of shingle beaches and sandy strandlines
CHEN	plants of annual nitrophilous weed communities of cultivated and other disturbed land, especially rootcrop fields and gardens
EPIL	plants of nitrophilous woodland edge and clearing communities
FEBR	plants of drier, typically calcareous, grassland
MOAR	plants of grassland, including the wetter meadows and pastures, and adjacent paths
NACA	plants of grass- and dwarf-shrub (typically *Calluna*-) dominated dry heaths and moors
PHRA	plants of freshwater reedswamp communities
QUER	plants of deciduous woodland on poorer soils
QUFA	plants of deciduous woodland on better soils
RHPR	plants of woodland edge scrub communities
SECA	plants of annual weed communities in cereal fields
TRGE	plants of species-rich communities of grassland/scrub boundaries, often calcicolous

*Table 3. Complete list of invertebrate taxa recorded from The Brooks, Winchester. Conventions: 'sp(?).' — indicates probable additional taxon; 'sp(?). indet.' — indicates may be (or include) previously listed taxon or taxa. Order and nomenclature for Insecta follow Kloet and Hincks (1964-77). *—taxa not used in calculating main statistics (see Table 4). Ecological codes are explained in the text.*

NEMATODA	
**Trichuris* sp.	
**Ascaris* sp.	
CRUSTACEA	
Porcellio dilatatus	u
DIPLOPODA	
Diplopoda sp.	u
CHILOPODA	
Chilopoda sp.	u
DERMAPTERA	
Dermaptera sp.	u
HEMIPTERA	
Heterogaster urticae (Fabricius)	oa-p
Heteroptera sp.	u
*Hemiptera sp. (nymph)	u
DIPTERA	
*Syrphidae sp. (larva)	u
*Syrphidae sp. (adult)	u
*Sepsidae sp. (puparium)	rt
*Limosininae spp. (puparium)	oa-w
**?Scatopse notata* (Linnaeus) (puparium)	rt
**Thoracochaeta zosterae* (Haliday) (puparium)	rf
*Sphaeroceridae spp. (puparium)	rt
*?Calliphoridae sp. (larva)	u
*Muscidae sp. (puparium)	u
*Diptera sp. (larva)	u
*Diptera sp. (pupa)	u
*Diptera spp. and spp. indet. (puparium)	u
SIPHONAPTERA	
**Pulex irritans* Linnaeus	ss
**Ctenocephalides canis* (Curtis)	st
HYMENOPTERA	
*Formicidae sp.	u
**Apis mellifera* Linnaeus	u
*Hymenoptera spp.	st
COLEOPTERA	
Nebria brevicollis (Fabricius)	oa
Clivina fossor (Linnaeus)	oa
Trechus micros (Herbst)	u
Bembidion sp.	oa
Pterostichus minor (Gyllenhal)	oa
Pterostichus niger (Schaller)	oa
Laemostenus terricola (Herbst)	ss
Laemostenus sp. indet.	ss
Agonum ?albipes (Fabricius)	oa-d
Amara sp.	oa
Carabidae spp. and spp. indet.	ob
Helophorus sp.	oa-w
Sphaeridium bipustulatum Fabricius	rf
Cercyon analis (Paykull)	rt-sf
Cryptopleurum minutum (Fabricius)	rf-st
Hydrobius fuscipes (Linnaeus)	oa-w
Teretrius fabricii Mazur	l
Acritus nigricornis (Hoffmann)	rt-st
Hister ?merdarius Hoffman	rt-sf
Histerinae sp. indet.	rt
Limnebius spp.	oa-w
Ptenidium sp.	rt
Ptiliidae sp.	u
Catops sp.	u
Silpha atrata Linnaeus	u
Scydmaenidae sp.	u
Micropeplus fulvus Erichson	rt
Lesteva longoelytrata (Goeze)	oa-d
Phyllodrepa floralis group	rt-sf
Dropephylla vilis (Erichson)	l
Dropephylla sp. indet.	u
Omalium excavatum Stephens	rt-sf
Omalium caesum or *italicum*	rt-sf
Omalium rivulare (Paykull)	rt-sf
Xylodromus concinnus (Marsham)	rt-st
Omaliinae sp.	rt
Coprophilus striatulus (Fabricius)	rt-st
Carpelimus bilineatus Stephens	rt-sf
Carpelimus corticinus (Gravenhorst)	oa-d
Carpelimus elongatulus (Erichson)	oa-d
Carpelimus fuliginosus (Gravenhorst)	st
Anotylus complanatus (Erichson)	rt-sf
Anotylus nitidulus (Gravenhorst)	rt-d
Anotylus rugosus (Fabricius)	rt
Anotylus sculpturatus group	rt
Anotylus tetracarinatus (Block)	rt
Oxytelus sculptus Gravenhorst	rt-st
Stenus sp.	u
Lathrobium sp.	u
Gyrohypnus angustatus Stephens	rt-st
Gyrohypnus fracticornis (Muller)	rt-st
Gyrohypnus sp. indet.	rt

Xantholinus linearis or *longiventris*	rt-sf
Neobisnius sp.	u
Philonthus ?politus (Linnaeus)	u
Philonthus spp.	u
Staphylinus ?olens Muller	u
Creophilus maxillosus (Linnaeus)	rt
Ontholestes tessellatus (Fourcroy)	rf
Quedius mesomelinus (Marsham)	rt
Philonthus or *Quedius* sp.	u
Tachyporus sp.	u
Cordalia obscura (Gravenhorst)	rt-sf
Falagria sp.	rt-sf
Aleochara sp.	u
Aleocharinae spp.	u
Staphylinidae sp. indet.	u
Euplectini sp.	u
Pselaphidae sp.	u
Trox sp.	rt
Geotrupes sp.	oa-rf
Aphodius ?granarius (Linnaeus)	ob-rf
Aphodius spp.	ob-rf
Oxyomus sylvestris (Scopoli)	rt-sf
Clambus sp.	rt-sf
Scirtidae sp.	oa-d
Elateridae sp.	ob
?Cantharidae sp.	ob
Anthrenus sp.	rt-sf
?Dermestidae sp.	rt-sf
Xestobium rufovillosum (Degeer)	l-st
Anobium punctatum (Degeer)	l-sf
Tipnus unicolor (Piller & Mitterpacher)	rd-st
Ptinus fur (Linnaeus)	rd-sf
Ptinidae sp.	rd
Lyctus linearis (Goeze)	l-sf
Opilo mollis (Linnaeus)	l
Monotoma bicolor Villa	rt-st
Monotoma longicollis (Gyllenhall)	rt-st
Monotoma sp. indet.	rt-sf
Cryptolestes ferrugineus (Stephens)	g-ss
Oryzaephilus surinamensis (Linnaeus)	g-ss
Cryptophagus scutellatus Newman	rd-st
Cryptophagus spp.	rd-sf
Atomaria nigripennis (Kugelann)	rd-ss
Atomaria sp.	rd
?Sericoderus lateralis (Gyllenhal)	rt-st
Orthoperus sp.	rt
Mycetaea hirta (Marsham)	rd-ss
Lathridius minutus group	rd-st
Enicmus sp.	rt-sf
Dienerella ?filum (Aubé)	rd-sf
Dienerella sp. indet.	rd-sf
Corticaria ?fulva (Comolli)	rt-sf
Corticaria spp. and spp. indet.	rt-sf
Cortinicara gibbosa (Herbst)	rt
Mycetophagus sp.	u
Aglenus brunneus (Gyllenhal)	rt-ss
Blaps sp.	rt-ss
Tenebrio obscurus Fabricius	rt-ss
Anthicus sp.	rt
Bruchus sp.	u
Bruchus or *Bruchidius* spp.	u
Phyllotreta nemorum group	oa-p
Phyllotreta sp.	oa-p
Psylliodes sp.	oa-p
Halticinae sp.	oa-p
Apion sp.	oa-p
Sitona sp.	oa-p
Sitophilus granarius (Linnaeus)	g-ss
Ceutorhynchus sp.	oa-p
Ceuthorhynchinae sp.	oa-p
Curculionidae sp.	oa
Taphrorychus bicolor (Herbst)	l
*Coleoptera sp. (larva)	u
Insecta sp. (larva)	u
Insecta sp. (pupa)	u
ARACHNIDA	
*Acarina sp.	u
*Aranae sp.	u

Table 4. Main statistics for the assemblages of adult beetles and bugs from samples from The Brooks, Winchester. For explanation of ecological codes see text. N - number of individuals; S - number of taxa; P - percentage. Values of alpha given as 0.0 indicate that N < 20 or N = S and no calculation made.

Context	10036	10971	11082	11202	11393	11399	11853	Whole site
Sample	3	45	48	47	57	11399	561	
S	0	51	44	30	69	39	71	156
N	0	193	154	38	487	251	250	1373
ALPHA	0.0	22.7	20.7	64.8	22.0	13.0	33.1	45.3
SEALPHA	0.0	2.6	2.6	24.6	1.7	1.4	3.3	2.2
SOB	0	10	7	5	15	5	9	38
PSOB	0.0	19.6	15.9	16.7	21.7	12.8	12.7	24.4
NOB	0	13	8	5	17	5	9	57
PNOB	0.0	6.7	5.2	13.2	3.5	2.0	3.6	4.2
ALPHAOB	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.0
SEALPHAOB	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.1
SW	0	0	0	0	3	0	2	4
PSW	0.0	0.0	0.0	0.0	4.3	0.0	2.8	2.6
NW	0	0	0	0	3	0	2	5
PNW	0.0	0.0	0.0	0.0	0.6	0.0	0.8	0.4
ALPHAW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SEALPHAW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SD	0	3	1	0	3	3	1	7
PSD	0.0	5.9	2.3	0.0	4.3	7.7	1.4	4.5
ND	0	6	1	0	4	3	1	15
PND	0.0	3.1	0.6	0.0	0.8	1.2	0.4	1.1
ALPHAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SEALPHAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SP	0	3	1	2	4	1	2	9
PSP	0.0	5.9	2.3	6.7	5.8	2.6	2.8	5.8
NP	0	3	1	2	5	1	2	14
PNP	0.0	1.6	0.6	5.3	1.0	0.4	0.8	1.0
ALPHAP	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SEALPHAP	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SM	0	0	0	0	0	0	0	0
PSM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Context	10036	10971	11082	11202	11393	11399	11853	Whole site
Sample	3	45	48	47	57	11399	561	
NM	0	0	0	0	0	0	0	0
PNM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ALPHAM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SEALPHAM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SL	0	3	3	1	4	2	5	8
PSL	0.0	5.9	6.8	3.3	5.8	5.1	7.0	5.1
NL	0	27	6	1	28	8	7	77
PNL	0.0	14.0	3.9	2.6	5.7	3.2	2.8	5.6
ALPHAL	0.0	0.9	0.0	0.0	1.3	0.0	0.0	2.3
SEALPHAL	0.0	0.3	0.0	0.0	0.4	0.0	0.0	0.5
SRT	0	28	22	14	37	24	34	152
PSRT	0.0	54.9	50.0	46.7	53.6	61.5	47.9	97.4
NRT	0	141	126	21	421	227	162	1098
PNRT	0.0	73.1	81.8	55.3	86.4	90.4	64.8	80.0
ALPHART	0.0	10.5	7.8	18.8	9.8	6.8	13.2	47.9
SEALPHART	0.0	1.5	1.2	8.3	0.9	0.8	1.7	2.5
SRD	0	11	8	5	10	9	7	50
PSRD	0.0	21.6	18.2	16.7	14.5	23.1	9.9	32.1
NRD	0	116	106	9	330	184	95	840
PNRD	0.0	60.1	68.8	23.7	67.8	73.3	38.0	61.2
ALPHARD	0.0	3.0	2.0	0.0	2.0	2.0	1.8	11.7
SEALPHARD	0.0	0.5	0.4	0.0	0.3	0.3	0.4	0.9
SRF	0	2	0	0	4	4	2	12
PSRF	0.0	3.9	0.0	0.0	5.8	10.3	2.8	7.7
NRF	0	2	0	0	4	4	2	12
PNRF	0.0	1.0	0.0	0.0	0.8	1.6	0.8	0.9
ALPHARF	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SEALPHARF	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSA	0	29	24	11	31	19	30	59
PSSA	0.0	56.9	54.5	36.7	44.9	48.7	42.3	37.8
NSA	0	161	130	18	406	218	146	1079
PNSA	0.0	83.4	84.4	47.4	83.4	86.9	58.4	78.6
ALPHASA	0.0	10.4	8.7	0.0	7.8	5.0	11.5	13.4
SEALPHASA	0.0	1.4	1.3	0.0	0.8	0.7	1.5	0.9

Context	10036	10971	11082	11202	11393	11399	11853	Whole site
Sample	3	45	48	47	57	11399	561	
SSF	0	18	12	5	14	7	13	33
PSSF	0.0	35.3	27.3	16.7	20.3	17.9	18.3	21.2
NSF	0	67	33	8	111	29	43	291
PNSF	0.0	34.7	21.4	21.1	22.8	11.6	17.2	21.2
ALPHASF	0.0	8.1	6.9	0.0	4.3	3.0	6.4	9.6
SEALPHASF	0.0	1.6	2.0	0.0	0.7	0.9	1.6	1.0
SST	0	6	6	4	9	7	10	15
PSST	0.0	11.8	13.6	13.3	13.0	17.9	14.1	9.6
NST	0	49	84	7	115	52	37	344
PNST	0.0	25.4	54.5	18.4	23.6	20.7	14.8	25.1
ALPHAST	0.0	1.8	1.5	0.0	2.3	2.2	4.6	3.2
SEALPHAST	0.0	0.5	0.3	0.0	0.4	0.5	1.2	0.4
SSS	0	5	6	2	8	5	7	11
PSSS	0.0	9.8	13.6	6.7	11.6	12.8	9.9	7.1
NSS	0	45	13	3	180	137	66	444
PNSS	0.0	23.3	8.4	7.9	37.0	54.6	26.4	32.3
ALPHASS	0.0	1.5	0.0	0.0	1.7	1.0	2.0	2.1
SEALPHASS	0.0	0.4	0.0	0.0	0.3	0.2	0.5	0.3

Table 5. Records of preservation of insect remains from samples from The Brooks, Winchester. For definition of scale, see Kenward and Large, forthcoming. Note that for erosion and fragmentation the scale is 0.5 (excellent preservation) to 5.5 (extremely poor preservation).

Context	Sample	Erosion				Fragmentation				Colour change	
		From	To	Mode	Distribution, strength	From	To	Mode	Distribution, strength	Towards	Degree
10971	45	2	3.5	3	skewed +, strong,	1	3.5	2.5	skewed +, strong	brown	slight
11082	48	4	4.5	4-4.5	normal, all	1	4.5	3 4.5	both weak	pale	slight to very strong
11202	47	1.5	4	3	skewed +, strong	1.5	4	3.5	skewed +, strong	yellow	slight
11393	57	2.5	3.5	3	normal, weak	1.5	4	3	skewed +, distinct	pale	slight
11853	561	1.5	4	3	skewed +, strong	1.5	4.5	3 4.5	strong weak	brown	slight

Table 6. Lists of adult Coleoptera and Hemiptera of the groups used for calculating main statistics (see Table 4) from The Brooks, Winchester; taxa are in rank order of abundance and then taxonomic order within each list.

Context 10036, Sample 3/T

No records of adult Coleoptera or Hemiptera

Context 10971, Sample 45/T

Mycetaea hirta (Marsham)	39
Lathridius minutus group	24
Anobium punctatum (Degeer)	23
Cryptophagus sp. D	16
Tipnus unicolor (Piller & Mitterpacher)	13
Cryptophagus scutellatus Newman	7
Quedius mesomelinus (Marsham)	6
Dienerella ?filum (Aubé)	6
Ptinus fur (Linnaeus)	5
Lesteva longoelytrata (Goeze)	3
Xestobium rufovillosum (Degeer)	3
Atomaria ?nigripennis (Kugelann)	3
Corticaria sp. A	3
Trechus micros (Herbst)	2
Catops sp.	2
Carpelimus corticinus (Gravenhorst)	2
Corticaria sp. B	2
Heterogaster urticae (Fabricius)	1
Nebria brevicollis (Fabricius)	1
Bembidion sp.	1
Pterostichus niger (Schaller)	1
Laemostenus terricola (Herbst)	1
Cercyon analis (Paykull)	1
Histerinae sp.	1
Silpha atrata Linnaeus	1
Xylodromus concinnus (Marsham)	1
Carpelimus bilineatus Stephens	1
Anotylus complanatus (Erichson)	1
Anotylus nitidulus (Gravenhorst)	1
Philonthus sp.	1
Falagria sp.	1
Aleochara sp.	1
Aleocharinae sp. A	1
Aleocharinae sp. B	1
Staphylinidae sp.	1
Geotrupes sp.	1
Aphodius sp.	1
Clambus sp.	1
Anthrenus sp.	1
?Dermestidae sp.	1
Lyctus linearis (Goeze)	1
Monotoma longicollis (Gyllenhall)	1
Cryptolestes ferrugineus (Stephens)	1
Cryptophagus sp. A	1
Cryptophagus sp. B	1
Cryptophagus sp. C	1
Enicmus sp.	1
Bruchus sp.	1
Apion sp.	1
Sitona sp.	1
Sitophilus granarius (Linnaeus)	1

Context 11082, Sample 48/T

Tipnus unicolor (Piller & Mitterpacher)	54
Lathridius minutus group	24
Cryptophagus sp. B	15
Mycetaea hirta (Marsham)	5
Anobium punctatum (Degeer)	4
Cercyon analis (Paykull)	3
Quedius ?mesomelinus (Marsham)	3
Atomaria nigripennis (Kugelann)	3
Carabidae sp. A	2
Xylodromus concinnus (Marsham)	2
Aleocharinae sp. A	2
Oryzaephilus surinamensis (Linnaeus)	2
Cryptophagus scutellatus Newman	2
Cryptophagus sp. A	2
Corticaria sp.	2
Trechus micros (Herbst)	1
Laemostenus terricola (Herbst)	1
Carabidae sp. B	1
Carabidae sp. C	1
Carabidae sp. D	1
Ptenidium sp.	1
Phyllodrepa floralis group	1
Dropephylla sp.	1
Omalium rivulare (Paykull)	1
Omaliinae sp.	1
Carpelimus ?bilineatus Stephens	1
Anotylus complanatus (Erichson)	1
Oxytelus sculptus Gravenhorst	1
Neobisnius sp.	1
Creophilus maxillosus (Linnaeus)	1
Philonthus or Quedius sp.	1
Aleochara sp.	1
Aleocharinae sp. B	1
Aleocharinae sp. C	1
Scirtidae sp.	1
Xestobium rufovillosum	1
Lyctus linearis (Goeze)	1
Monotoma sp.	1

Cryptolestes ferrugineus (Stephens)	1
Dienerella sp.	1
Anthicus sp.	1
Phyllotreta nemorum group	1
Sitophilus granarius (Linnaeus)	1
Curculionidae sp.	1

Context 11202, Sample 47/T

Lathridius minutus group	4
Carpelimus bilineatus Stephens	3
Trechus micros (Herbst)	2
Anotylus complanatus (Erichson)	2
Mycetaea hirta (Marsham)	2
Carabidae sp.	1
Histeridae sp.	1
Ptenidium sp.	1
Xylodromus concinnus (Marsham)	1
Coprophilus striatulus (Fabricius)	1
Anotylus rugosus (Fabricius)	1
Neobisnius sp.	1
Philonthus sp. A	1
Philonthus sp. B	1
Aleocharinae sp. A	1
Aleocharinae sp. B	1
Staphylinidae sp.	1
Euplectini sp.	1
Trox sp.	1
Elateridae sp.	1
Anobium punctatum (Degeer)	1
Ptinus fur (Linnaeus)	1
Cryptophagus scutellatus Newman	1
Atomaria nigripennis (Kugelann)	1
Orthoperus sp.	1
Corticaria sp.	1
Bruchus sp.	1
Phyllotreta sp.	1
Ceutorhynchus sp.	1
Curculionidae sp.	1

Context 11393, Sample 57/T

Mycetaea hirta (Marsham)	152
Cryptophagus sp. B	60
Lathridius minutus group	46
Quedius mesomelinus (Marsham)	34
Tipnus unicolor (Piller & Mitterpacher)	25
Anobium punctatum (Degeer)	21
Atomaria nigripennis (Kugelann)	19
Xylodromus concinnus (Marsham)	15
Coprophilus striatulus (Fabricius)	13
Cryptophagus scutellatus Newman	12
Ptinus fur (Linnaeus)	8
Trechus micros (Herbst)	5
Lyctus linearis (Goeze)	5
Cryptophagus sp. A	4
Dienerella sp.	3
Sitophilus granarius (Linnaeus)	3
Catops sp.	2
Micropeplus fulvus Erichson	2
Carpelimus elongatulus (Erichson)	2
Anotylus sculpturatus group	2
Aleocharinae sp. C	2
Corticaria sp. A	2
Corticaria sp. C	2
Aglenus brunneus (Gyllenhal)	2
Sitona sp.	2
Bembidion sp.	1
Laemostenus terricola (Herbst)	1
Agonum ?albipes (Fabricius)	1
Amara sp.	1
Helophorus sp.	1
Cercyon analis (Paykull)	1
Cryptopleurum minutum (Fabricius)	1
Limnebius sp. A	1
Limnebius sp. B	1
Ptenidium sp.	1
Ptiliidae sp.	1
Dropephylla sp.	1
Omalium caesum or italicum	1
Anotylus complanatus (Erichson)	1
Anotylus nitidulus (Gravenhorst)	1
Anotylus rugosus (Fabricius)	1
Anotylus tetracarinatus (Block)	1
Stenus sp.	1
Gyrohypnus sp.	1
Staphylinus ?olens	1
Tachyporus sp.	1
Aleocharinae sp. A	1
Aleocharinae sp. B	1
Aleocharinae sp. D	1
Pselaphidae sp.	1
Geotrupes sp.	1
Aphodius sp. A	1
Aphodius sp. B	1
?Cantharidae sp.	1
?Dermestidae sp.	1
Xestobium rufovillosum	1
Opilo mollis	1
Monotoma longicollis (Gyllenhall)	1
Cryptolestes ferrugineus (Stephens)	1
Oryzaephilus surinamensis (Linnaeus)	1
Cryptophagus sp. C	1
?Sericoderus lateralis (Gyllenhal)	1
Orthoperus sp.	1
Corticaria sp. B	1
Cortinicara gibbosa (Herbst)	1
Tenebrio obscurus Fabricius	1

Halticinae sp.	1
Apion sp.	1
Ceuthorhynchinae sp.	1

Context 11399, Sample 11399

Mycetaea hirta (Marsham)	129
Lathridius minutus group	23
Cryptophagus sp. A	14
Xylodromus concinnus (Marsham)	11
Quedius mesomelinus (Marsham)	11
Coprophilus striatulus (Fabricius)	8
Anobium punctatum (Degeer)	7
Cryptophagus scutellatus Newman	5
Cryptophagus sp. B	4
Atomaria nigripennis (Kugelann)	4
Catops sp.	3
Tipnus unicolor (Piller & Mitterpacher)	3
Trechus micros (Herbst)	2
Aglenus brunneus (Gyllenhal)	2
Pterostichus minor (Gyllenhal)	1
Laemostenus sp.	1
Sphaeridium bipustulatum Fabricius	1
Cryptopleurum minutum (Fabricius)	1
Ptenidium sp.	1
Scydmaenidae sp.	1
Phyllodrepa ?floralis (Paykull)	1
Omalium excavatum Stephens	1
Carpelimus ?corticinus (Gravenhorst)	1
Carpelimus elongatulus (Erichson)	1
Anotylus nitidulus (Gravenhorst)	1
Anotylus tetracarinatus (Block)	1
Philonthus sp. A	1
Philonthus sp. B	1
Ontholestes tessellatus (Fourcroy)	1
Aleocharinae sp. A	1
Aleocharinae sp. B	1
Aphodius ?granarius (Linnaeus)	1
Xestobium rufovillosum	1
Ptinidae sp.	1
Atomaria sp.	1
Corticaria ?fulva (Comolli)	1
Corticaria sp.	1
Halticinae sp.	1
Sitophilus granarius (Linnaeus)	1

Context 11853, Sample 561/T

Mycetaea hirta (Marsham)	47
Bruchus sp.	20
Philonthus ?politus (Linnaeus)	18
Lathridius minutus group	14
Anotylus rugosus (Fabricius)	12
Atomaria nigripennis (Kugelann)	12
Cercyon analis (Paykull)	8
Cryptophagus scutellatus Newman	8
Carpelimus bilineatus Stephens	7
Cryptophagus sp. A	7
Coprophilus striatulus (Fabricius)	6
Ptinus fur (Linnaeus)	5
Aleocharinae sp. G	4
Anotylus complanatus (Erichson)	3
Philonthus sp.	3
Aleocharinae sp. B	3
Aleocharinae sp. H	3
Anobium punctatum (Degeer)	3
Aglenus brunneus (Gyllenhal)	3
Bruchus sp. or Bruchidius sp. A	3
Hister ?merdarius Hoffman	2
Ptenidium sp.	2
Anotylus sculpturatus group	2
Oxytelus sculptus Gravenhorst	2
Gyrohypnus angustatus Stephens	2
Cordalia obscura (Gravenhorst)	2
Aleocharinae sp. C	2
Cryptophagus sp. B	2
Orthoperus sp.	2
Bruchus sp. or Bruchidius sp. B	2
Heteroptera sp.	1
Clivina fossor (Linnaeus)	1
Amara sp.	1
Helophorus sp.	1
Sphaeridium bipustulatum Fabricius	1
Hydrobius fuscipes (Linnaeus)	1
Teretrius fabricii Mazur	1
Acritus nigricornis (Hoffmann)	1
Scydmaenidae sp.	1
Dropephylla vilis (Erichson)	1
Omalium rivulare (Paykull)	1
Xylodromus concinnus (Marsham)	1
Carpelimus fuliginosus (Gravenhorst)	1
Anotylus nitidulus (Gravenhorst)	1
Anotylus tetracarinatus (Block)	1
Lathrobium sp.	1
Gyrohypnus fracticornis (Muller)	1
Xantholinus linearis or longiventris	1
Neobisnius sp.	1
Aleochara sp.	1
Aleocharinae sp. A	1
Aleocharinae sp. D	1
Aleocharinae sp. E	1
Aleocharinae sp. F	1
Staphylinidae sp.	1
Pselaphidae sp.	1
Aphodius sp.	1
Oxyomus sylvestris (Scopoli)	1
Elateridae sp.	1
Lyctus sp.	1

Monotoma bicolor Villa	1
Oryzaephilus surinamensis (Linnaeus)	1
Corticaria sp.	1
Mycetophagus sp.	1
Blaps sp.	1
Tenebrio obscurus Fabricius	1
Psylliodes sp.	1
Sitophilus granarius (Linnaeus)	1
Ceuthorhynchinae sp.	1
Curculionidae sp.	1
Taphrorychus bicolor (Herbst)	1

Table 7. Lists of macroinvertebrate remains other than adult Coleoptera and Hemiptera from The Brooks, Winchester. Taxa are in rank order of abundance.

Context 10036, Sample 3/T

Thoracochaeta zosterae (puparium)	50

Context 10971, Sample 45/T

Insecta sp. pupa	100
Thoracochaeta zosterae (puparium)	50
Limosininae sp. B (puparium)	40
Limosininae sp. A (puparium)	20
Acarina sp.	15
Diptera sp. (adult)	15
Formicidae sp.	15
Coleoptera sp. (larva)	6
Diptera sp. (larva)	6
Ctenocephalides canis	1
?Scatopse notata (puparium)	1
Aranae sp.	1
Dermaptera sp.	1
Diptera sp. A (puparium)	1
Diptera sp. B (puparium)	1

Context 11082, Sample 48/T

Acarina sp.	15
Diptera sp. (adult)	15
Thoracochaeta zosterae (puparium)	15
Diptera sp. (pupa)	15
Hymenoptera sp.	6
Sphaeroceridae sp. (puparium)	3
Aranae sp.	3
Limosininae sp. (puparium)	2
Syrphidae sp. (larva)	2
Dermaptera sp.	1

Context 11202, Sample 47/T

Thoracochaeta zosterae (puparium)	23
Limosininae sp. A (puparium)	11
Acarina sp.	6
Diptera sp. (adult)	6
Limosininae sp. B (puparium)	6
Insecta sp. (larva)	6
Syrphidae sp. (larva)	6
Insecta sp. pupa	6
?Scatopse notata (puparium)	5
Hemiptera sp. (nymph)	1

Context 11393, Sample 57/T

Insecta sp. pupa	500
Limosininae sp. B (puparium)	50
Coleoptera sp. (larva)	15
Acarina sp.	15
Diptera sp. (adult)	15
Formicidae sp.	15
Limosininae sp. A (puparium)	15
Diptera sp. (larva)	15
Pulex irritans	6
Hymenoptera sp.	6
Ctenocephalides canis	4
?Scatopse notata (puparium)	1
Aranae sp.	1
Diplopoda sp.	1

Context 11399, Sample 11399

Pulex irritans	5
Chilopoda sp.	1
Porcellio dilatatus	1

Context 11853, Sample 561/T

Thoracochaeta zosterae (puparium)	100
Limosininae sp. A	100
Limosininae sp. B	100
Coleoptera sp. (larva)	15
Acarina sp.	15
Diptera sp. (adult)	15
Diptera sp. (larva)	15
Syrphidae sp. (larva)	15
Pulex irritans	13
Diptera sp. D (puparium)	7
Sphaeroceridae sp. A	6
Sphaeroceridae sp. B	6
?Scatopse notata (puparium)	6
Apis mellifera	6
Diptera sp. C (puparium)	6
Diptera sp. E (puparium)	6
Insecta sp. pupa	6
Diptera sp. F (puparium)	5
Sepsidae sp. (puparium)	3
Formicidae sp.	3
Syrphidae sp. (adult)	3
Muscidae sp. (puparium)	2
Aranae sp.	2
?Calliphoridae sp. (larva)	1
Dermaptera sp.	1

Diplopoda sp.	1	Diptera sp. B (puparium)	1
Hemiptera sp. (nymph)	1	Diptera sp. G (puparium)	1
Diptera sp. A (puparium)	1		