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by

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Summary

Samples from Late Bronze Age/Early Iron Age waterside deposits associated with a timber structure, perhaps a platform, yielded modest to quite large numbers of invertebrate fossils, including a range of insects (predominantly beetles), Cladocera and Bryozoa. Fragmentation was often extreme and many identifications of fragmented remains were impracticable. The deposits formed in open water, with emergent and waterside vegetation. There were hints of the local dry-land habitats, perhaps grazing land and some trees. Some samples gave abundant riffle beetles, indicative of clean, well aerated, probably moving, water. Synanthropes and wood-borers were rare, a significant parallel with the fauna from nearby Flag Fen.

Keywords: ASSESSMENT, LATE BRONZE AGE/EARLY IRON AGE, TIMBER STRUCTURE, INVERTEBRATES, INSECTS, AQUATIC, RARITY OF SYNANTHROPES

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Insect remains from Must Farm, Whittlesey, Cambridgeshire

Introduction

An alignment of timber posts was found along the southern edge of Must Farm Quarry Pit in 1999, when the water table was lowered. During subsequent visits Late Bronze Age/Early Iron Age pottery was recovered, as well as Neolithic worked flint. Trial excavations in 2005 revealed fourteen timber posts on a mainly northwest-southeast alignment, occurring in and parallel to a palaeochannel that ran across the southern part of the site. It appeared that there had been a platform constructed at the margin of a lake or swamp, rather like that at Flag Fen, which is located not far away. Radiocarbon dating of samples from two timbers gave dates of 1120–810 cal. BC and 800–400 cal. BC, placing the construction of the alignment at the end of the Bronze Age or in the Early Iron Age (Evans and Knight 2005). The samples studied for insect remains described here are believed to be of similar date. The site is under threat of degradation of the buried organic archaeology through a falling water table consequent upon mineral extraction.

This report presents the results of assessment and analysis of insect and other invertebrate remains from a series of sediment samples chosen to represent the vertical succession through the deposits associated with the timbers.

Methods

A series of general Biological Analysis (GBA) samples (*sensu* Dobney *et al.* 1992) was taken by the excavators from a section representing the main deposits, within the enclosing palisade, central to the platform. The samples relate to the same sequence as the other environmental proxies examined. The sediment was examined visually in the laboratory and described using a *pro forma*. Subsamples of 2–2.5 kg were processed from each, using standard methods described by Kenward *et al.* (1980; 1986), i.e. wet sieving using hot water, followed by paraffin flotation in order to extract any insect remains. The residues were stored wet.

The flots resulting from paraffin flotation were examined for insect and other macro-invertebrate remains using a low-power binocular microscope. The fragments were picked out and kept on damp filter paper in square plastic ‘Petri’ dishes, together with a few thymol crystals to prevent mould growth, before being identified with reference to standard identification manuals and modern specimens. Lists of taxa from each sample were made, in the case of the beetles and bugs either fully or semi-quantitatively, and for other invertebrates, semi-quantitatively (Kenward 1992; Kenward *et al.* 1986).

The preservational condition of the insect remains was recorded using the scales proposed by Kenward and Large (1998). In summary, preservation is recorded as chemical erosion (E) and fragmentation (F), in each case on a scale from 0.5 (in superb condition) to 5.5 (extremely decayed or fragmented).

Results

All of the samples contained at least modest numbers of invertebrate remains, and some were quite rich. Many of the fossils were highly fragmented and some were poorly preserved, often making identification difficult or impracticable. The fragmentation was probably in part a result of the robust treatment required to break down some of the sediments, but even in Sample 89 from Context 378, which disaggregated very easily, there were abundant very fragmented remains. The assemblages of beetles and bugs were of modest size, but sufficient for a limited

interpretation, and in particular for estimation of the importance of synanthropic species (here defined as those especially associated with habitats created by human occupation). All were dominated by local aquatic and waterside fauna, and truly terrestrial insects were unfortunately rare.

A complete list of the invertebrates recorded is given in Table 1, main statistics by ecological groups in the assemblages and for the site as a whole in Table 2, and an explanation of ecological codes in Table 3. Detailed species lists and notes are given in the Appendix.

Sample-by-sample account

The results are presented in stratigraphic order, from oldest to youngest.

Context 378, Sample 89

Laboratory sediment description: Moist, soft clay silt, primarily grey, externally oxidised browner. Some shells. Disaggregated easily

Invertebrate remains: While the remains were chemically little damaged (E 1.5-2.5, mode 2.0 weak), a large proportion of the sclerites were fragmented (F 2.5-5.0, mode 4.0 distinct). Recording was semi-quantitative. A quite substantial assemblage of adult beetles and bugs was recovered, 131 individuals of 86 taxa being identifiable, and there were also very large numbers of fragments of immature insects, abundant ostracods, some mites, and a range of other invertebrate remains. The three most abundant taxa (all 'several') were corixid bugs, *Helophorus* sp., and *Ochthebius minimus*, all common aquatics. Other aquatic and waterside species were well represented, over two-fifths of the individuals falling in these categories. Specimens of *Odacantha melanura*, found in reed beds, *Chrysolina menthastri*, found on waterside labiates, and *Agelastica alni*, an alder (*Alnus*) feeder which probably became extinct in Britain in the later Holocene, were notable among them. The overall implication is of reasonably clean water, with plenty of vegetation, and with mud and plant litter at the margins. Two *Oulimnius* sp. testify to well aerated, probably moving water, though this may have been in a stream inflow. There were not many 'dry-land' insects, but they included four *Rhynchaenus quercus*, a weevil associated with oak (*Quercus*), and a single *Phyllopertha horticola*, a root-feeding chafer typically found in poor grazing land. The presence of rotten wood was indicated by the small stag beetle *Sinodendron cylindricum*, but woodworm and other common beetles found in structural timbers were notable absentees.

Context 382, Sample 4

Laboratory sediment description: Mostly a large lump of dark grey-brown resistant plastic clay; had to be cut up into smaller pieces with a knife before sieving, and most had to be treated roughly to disaggregate it. Some ?rootlets.

Invertebrate remains: A fairly large assemblage of adult beetles and bugs (121 individuals of 86 taxa) was accompanied by abundant ostracods and insect immatures (undoubtedly of aquatic species), and modest numbers of chironomid midge larvae and mites; there were small numbers of various other invertebrates. Chemical erosion of the fossils was limited (E 1.5-2.5, mode 2 weak), but many were very fragmented (F 2.5-5.0, mode 4.0 weak). Aquatics predominated among the beetles and bugs, of which almost half the individuals fell in this category. Almost another fifth were waterside or damp ground taxa. The most abundant aquatic was the elmid 'riffle beetle' *Oulimnius* sp., requiring clear well oxygenated water. There was also a single *Normandia nitens*, another elmid with similar requirements. The presence of so many elmid suggests either that the deposit received a considerable input from a stream (perhaps unlikely in

view of the rarity of terrestrial insects, which would inevitably be washed in with the elmids), or that these beetles lived in situ, perhaps taking advantage of the conditions created by water lapping against timbers. The other aquatics were indicative of reasonably clean water, with aquatic vegetation. Most of the remaining fauna would have lived at the margins of water, but there were a few species requiring drier conditions. These included the ground bug *Rhyparochromus pini* (normally found beneath heather and heaths with adjacent trees, Southwood and Leston 1959), the chafers ?*Melolontha* sp. and *Phyllopertha horticola* (both suggesting well-drained grassland), and the leaf beetle *Chrysolina marginata* (associated with various herbaceous plants of fairly well drained soils, Mohr 1966). Three dung beetles were identified, insufficient to indicate grazing land. The only wood-associated insect was a single unidentified scolytid beetle.

Context 380, Sample 2

Laboratory sediment description: Very shelly mid-brown silt, locally ginger or without molluscs. Hard to break down, lumps had to be crushed and many clasts of less than 1 cm remained at the start of paraffin extraction.

Invertebrate remains: Only a small group of adult beetles and bugs was recovered, including 47 individuals of 39 taxa. There were, however, very large numbers of fragments of immature insects, presumably aquatic species, and abundant ostracods and aquatic molluscs. Preservation of the insects varied greatly, from fairly good to poor, with some remains extremely fragmented and quite unidentifiable (E 3.5-4.5, mode 3.5 strong; F 2.5-5.5, mode 4.0 weak). In this case, robust treatment during extraction almost certainly caused much of the fragmentation, and many remains may have been rendered unrecognisable or broken into small fragments which passed through the sieve. Most of the beetles and bugs were associated with aquatic or waterside habitats of various kinds, the only species requiring drier conditions being the chafer *Phyllopertha horticola*.

Context 367, Sample 130

Laboratory sediment description: Moist, mid to dark grey silt with orange patches, and with immense numbers of gastropod shells, whole freshwater mussel shells (two in the subsample) and a wood fragment.

Invertebrate remains: Erosion and fragmentation varied greatly, ranging from 1.5 to 5.0 with a mode of 3.0 in each case. The subsample yielded a rather small insect assemblage, including at least 50 species of beetles and bugs (but only 56 individuals), and also mites, numerous statoblasts of the bryozoans *Cristatella mucedo* and *Lophopus crystallinus*, *Daphnia* ephippia, and an unidentified egg mass. No species of beetle was represented by more than three or so individuals, most by only one.

The dominant group of taxa represented aquatic conditions. Although none were abundant, together they were indicative of open water of quite good quality, with submerged and emergent vegetation. A single *Oulimnius* sp., indicative of clean moving water, was also found, and the bryozoans also indicate clean water. Waterside plants were indicated by a range of taxa, and mud by water by some others. A few of the plant feeders exploit plants more typical of drier ground, but still may well have originated at the water's edge. Areas of grassland on drier ground, probably with a mineral soil, must also have been present to support *Phyllopertha horticola*. There were two species (three individuals) of *Aphodius* dung beetles, but these were insufficient to indicate grazing land. There was no evidence of human occupation, only a single facultative synanthrope being recorded.

Context 358, Sample 129

Laboratory sediment description: Moist, light yellowish grey to very dark brown clay and sand, very heterogeneous on the mm to cm scale, with traces of mollusc shell and grit (mm scale).

Invertebrate remains: The estimate of chemical erosion of the fossils ranged from 2.5 (moderately good preservation) to 5.0 (very poor preservation), with a mode of 3.5. Fragmentation ranged from 1.5 to 5.0, with a mode of 4.0. This subsample among those from Must Farm produced the lowest number of identifiable insect remains: only 20 species and 26 individuals of adult beetles and bugs, though there were also appreciable numbers of *Cristatella mucedo* statoblasts and various other, mainly aquatic, invertebrates in small numbers.

Taxa representing aquatic conditions contributed half of the assemblage. *Oulimnius* sp. indicates a clean inflowing stream or lakeshore. Other species were, or may have been, associated with waterside habitats and none required drier conditions.

Context 370, Sample 128

Laboratory sediment description: Moist, very dense, silty clay, dark grey with orange partings; ?marly patches, traces of plant debris, very decayed wood, charred twig, some mollusc shells, and ?occupation debris.

Invertebrate remains: This sample yielded large numbers of tiny insect fragments that could not reasonably be identified; there were therefore significantly more species present than are accounted for in the list. Erosion varied substantially (2.5-4.5, mode 4.0), fragmentation even more so (2.0-5.5, mode 4.0). A total of 76 species of adult beetles and bugs (106 individuals) was noted, with moderate numbers of cladoceran ephippia (*Daphnia* and a second type), mites, and *Cristatella mucedo* and *Lophopus crystallinus* statoblasts.

Again aquatic beetles (and one bug) were dominant (36% of the assemblage). Fifteen individuals of *Oulimnius* sp. (the most abundant beetle taxon) provided strong evidence for a clean and well-aerated inflowing stream or a clean, active, lake shore. Other aquatic invertebrates were abundant. Most of the remaining fauna could have exploited waterside habitats, plants, mud and litter.

Beetles associated with dung and other rotting organic material were noted, including the true dung beetles *Geotrupes* sp. and *Aphodius* sp., but the numbers were too small to suggest the presence of livestock or grazing land. These and the garden chafer *Phyllopertha horticola* suggest drier terrain and the Elateridae sp. perhaps had a similar origin. This subsample yielded the only example of a beetle typical of occupation deposits from the site: *Anobium* sp., probably *A. punctatum*, the woodworm. However, it is not uncommon in dead timber in the wild and may not have exploited structural wood.

Context 357, Sample 127

Laboratory sediment description: Moist, silty clay, dark grey with orange patches, with abundant mollusc shells, and some charred twigs.

Invertebrate remains: Chemical preservation was fairly good, though the remains were often very fragmentary (E 2.0-3.5, mode 3.0; F 2.5-5.5, mode 4.0). Recording was semi-quantitative. Remains of beetles were quite abundant (71 taxa, approximately 115 individuals). Other abundant invertebrates were *Daphnia* ephippia, mites and statoblasts of *Cristatella* and *Lophopus*. Again, aquatic conditions, aquatic and waterside plants, and litter, were well represented by the beetles, with *Ochthebius minimus* and *Oulimnius* sp. both abundant and small numbers of a range of others (aquatic and waterside taxa contributed over half of the individuals).

There were hints of drier conditions including trees or shrubs, from *Anthonomus* sp. and *Rhamphus* sp. (?). *Phyllopertha horticola* (two individuals) probably originated in grassland. Five species of true dung beetles were recorded as single individuals (four *Aphodius* and *Geotrupes* sp.), so perhaps there was livestock not too far away. Thus, there are clear hints of a modified environment, perhaps grazing; there were no species clearly associated with human occupation, however (*Xantholinus longiventris*, the only beetle classified as a facultative synanthrope, is abundant in natural and semi-natural conditions).

Context 356, Sample 126

Laboratory sediment description: Moist, rather stiff and slightly brittle, humic clay which perhaps had been de-watered and thus indurated at some stage. Dark grey with orange patches; some white flecks, perhaps fragments of mollusc shells.

Invertebrate remains: Erosion ranged from 2.0 to 4.5 with a mode of 3.5. Fragmentation varied from slight to extreme, 1.5 to 5.0 with a mode of 3.5, a significant number of fossils being too fragmented for identification to be practicable. A modest-sized assemblage of beetles and bugs (38 taxa, 44 individuals), together with midge larvae (Chironomidae), *Lophopus crystallinus* and *Cristatella mucedo* statoblasts, and *Daphnia* ephippia, attested to aquatic deposition in conditions similar to those indicated by the other assemblages from the site. The only species suggesting drier ground were *Amara* sp. (though even this might live by water) and *Phyllopertha horticola*.

Context 457, Sample 125

Laboratory sediment description: Moist silty clay, flaking into layers; heterogeneous, yellowish to mid/dark grey. Traces of mollusc shell and plant remains, and ?marl.

Invertebrate remains: The degree of chemical erosion varied (E 2.5-4.5, mode 4.0), and fragmentation was even more variable and sometimes extreme (1.5-5.5, mode 4.5). Many fragments could not be identified, so there were certainly more species than given in the list. Forty-two beetle and bug taxa were recorded, mostly in small numbers (totalling 59 individuals), along with quite large numbers of mites and *Cristatella mucedo* statoblasts, and smaller quantities of *Daphnia* ephippia. and *Lophopus crystallinus* statoblasts.

Taxa representing aquatic conditions were again the dominant group, though proportionally rather less abundant than in the other assemblages (a quarter of the individuals). There was a single *Oulimnius*. Most of the remaining invertebrates would have been found by water, on plants or mud, or in litter. Only *Phyllopertha horticola* and two *Aphodius* species suggested drier conditions.

Discussion

The subsamples contained sufficient insect remains to allow a broad reconstruction of depositional regime, local ecology and climate. The relative rarity of clearly 'dry land' insects (primarily some dung beetles and the chafer *Phyllopertha horticola*) suggests that the reconstruction of habitats away from water would be limited even from very large subsamples. Preservation was sometimes fairly good, but many remains were in poor to very poor condition in each sample, mainly because they were highly fragmented, leading to difficulty with identification. Indeed, many fragments could not be identified. Chemical erosion of the sclerites sometimes presented a problem in identification, too. Some of the damage to fossils was probably caused by the necessity to use considerable pressure to break down some of the deposits. However, even those samples which disaggregated more easily gave fragmented fossils, so it seems quite probable that the fragmentation had been caused by compression by

farm or mineral extraction machinery, or conceivably by de-watering. There was no evidence of blanket decomposition of the organic fraction in the samples such as discussed by Kenward and Hall (2000).

The recovered taxa were largely indicative of aquatic and marshland habitats – mainly freshwater swamp with areas of open water. These components contributed over half of the individuals from the site (Table 2). Most of the remaining fauna would have lived happily on vegetation and in natural litter near water. Grassland was suggested by rare (but repeatedly recorded) individuals of *P. horticola*, and there were single individuals of other species from dry habitats, notably *Rhyparochromus pini* and *Chrysolina marginata*. The assemblages gave at least some hints from dung beetles of livestock in the wider landscape, though no clear evidence that beasts grazed nearby.

Sample 128 (Context 370) came from a level associated with burnt wood, and Sample 126 (Context 356) from a post-fire level, yet there is no evidence of this in the beetles assessed. This is probably because most of the beetles associated with burned wood are extremely rare, or perhaps more probably because the burned timbers quickly became submerged. The construction, use and demolition of the platform and associated timber work is not reflected in the insect remains: only one indicator of structural wood – *Anobium* sp. (woodworm beetle) – was found (in Sample 128), but this was at least as likely to have come from natural dead wood as from structural timber. A single example of the small stag beetle *Sinodendron cylindricum* and a scolytid bark beetle are more likely to have originated in natural conditions. The almost complete lack of dead wood taxa might be taken to suggest that woodland or scrubland was not present in the vicinity of the site, but research into modern parallels offers a warning that such habitats may not be very visible in insect assemblages formed more than a few metres away, because tree-associated insects often disperse poorly (Kenward 2006). Significantly, though, it appears that insects did not invade the timber on site. There were two beetles associated with living trees: *Agelastica alni* (on alder) and *Rhynchaenus quercus* (on oak), and the host trees for these were probably not far away.

Synanthropic insects (in the sense of those associated with human occupation) were effectively absent. It is very hard to believe that, had the platform been occupied, such insects would not have fallen into the water below, either when migrating or by filtering with litter through cracks. This lack of synanthropic and wood-associated insects has a remarkable parallel in Robinson's (1992) analyses of deposits at the nearby Flag Fen site. Robinson examined insect assemblages from a column through the full depth of organic sediments adjacent to the late Bronze Age platform, and from the platform itself. There was little difference between assemblages from the platform and the column. As at Must Farm there was little indication of ecological change through time. Fenland habitats were predominant, with well-vegetated open water, exposed peat and litter for ground beetles and decomposers. Some insects perhaps originated further away, including *Agelastica alni*, 'probably extinct in Britain'; as noted above, it was also found at Must Farm. At Flag Fen, *Phyllopertha horticola* and a 'significant presence' of dung beetles including *Onthophagus taurus* (now extinct in Britain, and not seen at the present site) seem to have pointed to grazing. The evidence for grazing land at Must Farm is judged to be slight, again from *Phyllopertha horticola* and small numbers of dung beetles. There were not many foul decomposers at either site. There was no evidence for wood beetles originating in structures on or near to the platforms (only one *Anobium punctatum* at Flag Fen, one *Anobium* sp. at Must Farm), and there were no synanthropic decomposers.

The absence of synanthropes at both sites seems significant. As Robinson pointed out, they occur at other Bronze Age sites, and at the somewhat similar Iron Age site at Meare Lake Village West (the latter had woodworm and lathridiids, and other synanthropes such as *Ptinus fur*,

Girling 1979). At Flag Fen there were many water beetles in platform deposits: Robinson suggested that there were pools of water on the platform, which rapidly became waterlogged and inhospitable to wood-borers (though other explanations seem possible), and that the absence of wood borers along the Somerset Levels trackways may have a similar explanation. It may be suggested that the Must Farm structure was not occupied and that its timbers were either quickly burned or entirely too wet for wood borers: if the latter, it was probably only a platform at or near water level, without superstructure, perhaps a landing stage.

Archive

All extracted fossils and flots are currently stored in the Department of Archaeology, University of York, along with paper and electronic work pertaining to the work described here.

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Table 1. Complete list of invertebrate remains recorded from samples from Must Farm. Order and nomenclature follow Kloet and Hincks (1964-77) for insects and does not take account of more recent nomenclatural changes. Ecological codes used in calculating statistics (Table 2) are given (ec); they are explained in Table 3. * = not used in calculating assemblage statistics. The remains were of adults unless stated. The abbreviation 'sp.' indicates that the record was probably an additional taxon, 'sp. indet.' that the material may have been of a taxon listed above it; nr is the number of subsamples from which the taxon was recovered at Must Farm.

Taxon	ec	nr			
			<i>Pterostichus</i> sp. indet.	ob	2
			<i>Calathus</i> sp.	oa	1
* <i>Daphnia</i> sp. (ephippium)	oa-w	8	<i>Agonum obscurum</i> (Herbst)	oa-d	1
*Cladocera sp. (ephippium)	oa-w	3	? <i>Agonum</i> sp.	oa	1
*Ostracoda sp.	u	3	<i>Amara</i> sp.	oa	3
			<i>Acupalpus</i> sp.	oa	1
* <i>Sialis</i> sp.	oa-w	2	<i>Odacantha melanura</i> (Linnaeus)	oa-d	1
			<i>Dromius</i> ? <i>longiceps</i> Dejean	oa-d	1
*Trichoptera sp.	oa-w	3	<i>Dromius</i> sp.	oa	1
*Trichoptera sp. (case)	oa-w	1	Carabidae spp. and spp. indet.	ob	6
*Trichoptera sp. (larva)	oa-w	1	<i>Haliphus</i> sp.	oa-w	5
			<i>Noterus</i> sp.	oa-w	3
Pentatomidae sp.	oa-p	1	<i>Coelambus</i> sp.	oa-w	1
*Pentatomidae sp. (nymph)	oa-p	1	<i>Hygrotus inaequalis</i> (Fabricius)	oa-w	2
<i>Stygnocoris</i> sp.	oa	1	<i>Hydroporus</i> spp.	oa-w	1
<i>Drymus</i> ? <i>sylvaticus</i> (Fabricius)	oa-p	1	Hydroporinae spp. and spp. indet.	oa-w	7
<i>Drymus</i> sp. indet.	oa-p	1	<i>Agabus bipustulatus</i> (Linnaeus)	oa-w	1
<i>Rhyarochromus pini</i> (Linnaeus)	oa-p	1	<i>Agabus</i> or <i>Ilybius</i> sp.	oa-w	5
<i>Chartoscirta</i> sp.	oa-w	1	<i>Rhantus</i> sp.	oa-w	2
Saldidae sp. indet.	oa-d	1	<i>Colymbetes fuscus</i> (Linnaeus)	oa-w	3
? <i>Microvelia</i> sp.	oa-w	1	Colymbetinae sp. indet.	oa-w	2
<i>Gerris</i> sp.	oa-w	3	<i>Dytiscus</i> sp.	oa-w	3?1
<i>Corixa</i> sp.	oa-w	1	<i>Gyrinus</i> sp.	oa-w	6
Corixidae sp.	oa-w	3	<i>Hygrotus versicolor</i> (Schaller)	oa-w	1
*Corixidae sp. (nymph)	oa-w	1	<i>Hydrochus</i> sp.	oa-w	6
? <i>Aphrophora alni</i> (Fallen)	oa-p	1	<i>Helophorus aquaticus</i> or <i>grandis</i>	oa-w	2
Cicadellidae sp.	oa-p	3	<i>Helophorus</i> spp.	oa-w	8
Delphacidae sp.	oa-p	4	<i>Coelostoma orbiculare</i> (Fabricius)	oa-w	2
*Aphidoidea sp.	u	1	<i>Cercyon</i> sp. (mostly aquatic forms)	u	6
			<i>Megasternum obscurum</i> (Marsham)	rt	4
*Thysanoptera sp.	oa	1	<i>Hydrobius fuscipes</i> (Linnaeus)	oa-w	6
			<i>Laccobius</i> spp.	oa-w	2
*Lepidoptera sp. (pupa)	u	1	<i>Berosus</i> sp.	oa-w	1
			Hydrophilinae sp.	oa-w	9
*Diptera sp. (adult)	u	2	Histerinae sp.	rt	1
*Diptera sp. (puparium)	u	1	<i>Ochthebius minimus</i> (Fabricius)	oa-w	6?1
*Chironomidae sp. (larva)	w	3	<i>Ochthebius</i> sp. indet.	oa-w	3
*Bibionidae sp.	u	1	<i>Hydraena testacea</i> Curtis	oa-w	5
			<i>Hydraena</i> sp.	oa-w	6
<i>Blethisa multipunctata</i> (Linnaeus)	oa-d	1	<i>Limnebius</i> sp.	oa-w	1
<i>Elaphrus cupreus</i> Duftschmid	oa-d	3	<i>Ptenidium</i> sp.	rt	1
<i>Dyschirius globosus</i> (Herbst)	oa	2	<i>Aclypea opaca</i> (Linnaeus)	ob-rt	1
<i>Clivina fossor</i> (Linnaeus)	oa	1	<i>Metopsia retusa</i> (Stephens)	u	1
<i>Trechus quadristriatus</i> (Schrank)	oa	1	<i>Proteinus</i> sp.	rt	2
<i>Trechus obtusus</i> or <i>quadristriatus</i>	oa	1	<i>Lesteva heeri</i> Fauvel	oa-d	1?1
<i>Bembidion properans</i> Stephens	oa	1	<i>Dropephylla</i> sp.	u	1
<i>Bembidion lampros</i> or <i>properans</i>	oa	1	<i>Omalium caesum</i> or <i>italicum</i>	rt-sf	1
<i>Bembidion assimile</i> Gyllenhal	oa-d	1	<i>Omalium</i> sp. indet.	rt	2
<i>Bembidion</i> ? <i>doris</i> (Panzer)	oa-d	1	Omalinae sp.	rt	1
<i>Bembidion</i> (<i>Philochthus</i>) sp.	oa	1	<i>Bledius</i> sp.	oa-d	1
<i>Bembidion</i> spp.	oa	6	<i>Carpelimus</i> spp.	u	4
<i>Pterostichus</i> ? <i>gracilis</i> (Dejean)	oa-d	1	<i>Platystethus alutaceus</i> Thomson	oa-d	1
<i>Pterostichus</i> ? <i>minor</i> (Gyllenhal)	oa	1	<i>Platystethus cornutus</i> group	oa-d	1

<i>Platystethus nitens</i> (Sahlberg)	oa-d	2?1	<i>Chrysolina marginata</i> (Linnaeus)	oa-p	1
<i>Platystethus nodifrons</i> (Mannerheim)	oa-d	1?1	<i>Chrysolina menthastri</i> (Suffrian)	oa-p-d	1
<i>Anotylus nitidulus</i> (Gravenhorst)	rt	2	<i>Phaedon</i> sp.	oa-p	3?1
<i>Anotylus rugosus</i> (Fabricius)	rt	6	? <i>Hydrothassa</i> sp.	oa-d-p	1
<i>Anotylus sculpturatus</i> group	rt	1	<i>Prasocuris phellandrii</i> (Linnaeus)	oa-p-d	6
<i>Stenus</i> spp.	u	7	Chrysomelinae sp.	oa-p	2
<i>Lathrobium</i> sp.	u	3	<i>Galerucella</i> sp.	oa-p	4
<i>Rugilus</i> sp.	rt	1	<i>Agelastica alni</i> (Linnaeus)	oa-p	1
<i>Xantholinus longiventris</i> Heer	rt-sf	2	<i>Phyllotreta nemorum</i> group	oa-p	1
<i>Xantholinus</i> sp. indet.	u	3	<i>Phyllotreta</i> sp.	oa-p	1
<i>Erichsonius cinerascens</i> (Gravenhorst)	oa-d	1	<i>Longitarsus</i> sp.	oa-p	5
<i>Philonthus</i> spp.	u	5	<i>Altica</i> sp.	oa-p	1
<i>Gabrius</i> sp.	rt	2?2	<i>Epitrix</i> sp.	oa-p	2
Staphylininae sp.	u	5	<i>Chaetocnema arida</i> group	oa-p	1
<i>Habrocerus capillaricornis</i> (Gravenhorst)	rt	1	<i>Chaetocnema concinna</i> (Marsham)	oa-p	5
<i>Tachyporus</i> sp.	u	1	<i>Chaetocnema</i> sp. indet.	oa-p	1
<i>Tachinus</i> sp.	u	1	Halticinae spp.	oa-p	2
Aleocharinae spp.	u	7	<i>Apion</i> spp.	oa-p	6
Pselaphidae sp.	u	2	<i>Phyllobius pomaceus</i> Gyllenhal	oa-p	1
<i>Sinodendron cylindricum</i> (Linnaeus)	l	1	<i>Sitona lepidus</i> Gyllenhal	oa-p	1
<i>Geotrupes</i> sp.	oa-rf	3	<i>Sitona</i> sp. and spp. indet.	oa-p	3
<i>Aphodius ?ater</i> (Degeer)	oa-rf	1	<i>Hypera</i> sp.	oa-p	1
<i>Aphodius prodromus</i> (Brahm)	ob-rf	1	<i>Tanysphyrus lemnae</i> (Paykull)	oa-w-p	8
<i>Aphodius</i> spp. and spp. indet.	ob-rf	8	<i>Bagous</i> sp. s. lat.	oa-p-w	1
? <i>Melolontha</i> sp.	oa-p	1	<i>Notaris acridulus</i> (Linnaeus)	oa-d-p	4
<i>Phyllopertha horticola</i> (Linnaeus)	oa-p	8	<i>Notaris scirpi</i> (Fabricius)	oa-d-p	1
<i>Cyphon</i> spp.	oa-d	4	<i>Notaris</i> sp. indet.	oa-d-p	1
Scirtidae sp. indet.	oa-d	2	? <i>Thryogenes</i> sp.	oa-p	1
Byrrhidae sp.	oa-p	1	Bagoinae sp.	oa-w	2
<i>Heterocerus</i> sp.	oa-d	2	Ceutorhynchus spp.	oa-p	4
<i>Dryops</i> sp.	oa-d	5	Ceuthorhynchinae spp. and spp. indet.	oa-p	8
<i>Normandia nitens</i> (Muller)	oa-w	1	<i>Limnobaris pilistriata</i> (Stephens)	oa-p-d	1
<i>Oulimnius</i> sp.	oa-w	8	<i>Anthonomus</i> sp.	oa-p	1
Elateridae sp.	ob	3	? <i>Gymnetron</i> sp.	oa-p	1
<i>Anobium</i> sp.	l	1	<i>Rhynchaenus quercus</i> (Linnaeus)	oa-p	1
? <i>Anthocomus rufus</i> (Herbst)	oa	1	? <i>Rhamphus</i> sp.	oa-p	1
<i>Kateretes</i> sp.	oa-p-d	2	Curculionidae spp.	oa	3
<i>Meligethes</i> sp.	oa-p	1	Scolytidae sp.	l	1
<i>Omosita depressa</i> (Linnaeus)	u	1	Coleoptera sp.	u	5
Nitidulidae sp.	u	1	*Coleoptera sp. (larva)	u	2
<i>Psammoecus bipunctatus</i> (Fabricius)	oa-d	1			
<i>Atomaria</i> sp.	rd	6	*Chalcidoidea sp.	u	1
<i>Phalacrus</i> sp.	oa-p	3	*Proctotrupoidea sp.	u	1
<i>Corylophus cassidoides</i> (Marsham)	rt	1	*Hymenoptera Parasitica sp.	u	1
<i>Corylophus</i> sp. indet.	rt	5	*Hymenoptera sp.	u	2
<i>Corticaria</i> sp.	rt-sf	1			
Cisidae sp.	l	1	*Insecta sp. (immature)	u	9
<i>Anaspis</i> sp.	ob	1			
<i>Anthicus</i> sp.	rt	1	*Acarina sp.	u	9
<i>Donacia</i> spp.	oa-d-p	4			
<i>Plateumaris braccata</i> (Scopoli)	oa-d-p	1	*Gastropoda sp.	u	2
<i>Plateumaris ?affinis</i> (Kunze)	oa-d-p	1			
<i>Plateumaris</i> sp. indet.	oa-d-p	1	* <i>Lophopus crystallinus</i> (Pallas)	oa-w	6
Donaciinae sp. indet.	oa-d-p	5	* <i>Cristatella mucedo</i> Cuvier	oa-w	8

Table 2. Main statistics for the assemblages of adult beetles and bugs (excluding aphids and scale insects) from samples from Must Farm. For explanation of abbreviations, see Table 3. The index of diversity has not been calculated for assemblages of less than 20 adult beetles and bugs and is rendered here as '0'.

Context	356	357	358	367	370	378	380	382	457	Total
Sample	126	127	129	130	128	89	2	4	125	
Ext	/T	/T	/T	/T	/T	/1	/1	/1	/T	
S	38	68	20	50	75	89	39	86	42	238
N	44	115	26	56	106	131	47	121	59	705
ALPHA	130	70	41	220	114	122	48	132	65	125
SEALPHA	55	12	19	93	23	21	12	25	17	7
SOB	29	53	17	38	56	70	31	65	29	184
PSOB	76	78	85	76	75	79	79	76	69	77
NOB	34	92	23	42	79	105	39	98	42	554
PNOB	77	80	88	75	75	80	83	81	71	79
ALPHAOB	91	52	30	188	85	91	69	84	42	96
SEALPHAOB	43	10	14	95	20	18	26	17	13	7
SW	14	15	7	16	18	26	14	29	8	53
PSW	37	22	35	32	24	29	36	34	19	22
NW	17	44	13	18	38	49	22	57	15	273
PNW	39	38	50	32	36	37	47	47	25	39
ALPHAW	0	8	0	0	14	23	17	24	0	20
SEALPHAW	0	2	0	0	4	6	7	5	0	2
SD	5	10	4	7	8	17	4	13	4	42
PSD	13	15	20	14	11	19	10	15	10	18
ND	7	15	4	8	9	25	4	17	9	98
PND	16	13	15	14	8	19	9	14	15	14
ALPHAD	0	0	0	0	0	24	0	0	0	28
SEALPHAD	0	0	0	0	0	10	0	0	0	5
SP	11	19	9	12	18	22	12	20	15	68
PSP	29	28	45	24	24	25	31	23	36	29
NP	13	25	9	13	21	30	12	21	20	164
PNP	30	22	35	23	20	23	26	17	34	23
ALPHAP	0	37	0	0	58	38	0	187	28	44
SEALPHAP	0	17	0	0	34	15	0	167	15	6
SM	0	0	0	0	0	0	0	0	0	0
SL	0	0	0	0	1	2	0	1	0	4
PSL	0	0	0	0	1	2	0	1	0	2
NL	0	0	0	0	1	2	0	1	0	4
PNL	0	0	0	0	1	2	0	1	0	1
ALPHAL	0	0	0	0	0	0	0	0	0	0
SEALPHAL	0	0	0	0	0	0	0	0	0	0
SRT	4	11	2	8	12	7	4	10	7	44
PSRT	11	16	10	16	16	8	10	12	17	18
NRT	5	17	2	9	18	8	4	11	12	86
PNRT	11	15	8	16	17	6	9	9	20	12
ALPHART	0	0	0	0	0	0	0	0	0	36
SEALPHART	0	0	0	0	0	0	0	0	0	7
SRD	0	1	0	1	0	1	0	2	2	7
PSRD	0	1	0	2	0	1	0	2	5	3
NRD	0	1	0	1	0	1	0	2	3	8
PNRD	0	1	0	2	0	1	0	2	5	1
ALPHARD	0	0	0	0	0	0	0	0	0	0
SEALPHARD	0	0	0	0	0	0	0	0	0	0
SRF	1	5	0	2	4	2	1	3	2	20
PSRF	3	7	0	4	5	2	3	3	5	8

Context	356	357	358	367	370	378	380	382	457	Total
Sample	126	127	129	130	128	89	2	4	125	
Ext	/T	/T	/T	/T	/T	/1	/1	/1	/T	
NRF	1	5	0	3	4	2	1	3	3	22
PNRF	2	4	0	5	4	2	2	2	5	3
ALPHARF	0	0	0	0	0	0	0	0	0	101
SEALPHARF	0	0	0	0	0	0	0	0	0	70
SSA	0	1	0	1	0	1	0	1	0	3
PSSA	0	1	0	2	0	1	0	1	0	1
NSA	0	2	0	1	0	1	0	1	0	5
PNSA	0	2	0	2	0	1	0	1	0	1
ALPHASA	0	0	0	0	0	0	0	0	0	0
SEALPHASA	0	0	0	0	0	0	0	0	0	0
SSF	0	1	0	1	0	1	0	1	0	3
PSSF	0	1	0	2	0	1	0	1	0	1
NSF	0	2	0	1	0	1	0	1	0	5
PNSF	0	2	0	2	0	1	0	1	0	1
ALPHASF	0	0	0	0	0	0	0	0	0	0
SEALPHASF	0	0	0	0	0	0	0	0	0	0
SST	0	0	0	0	0	0	0	0	0	0
SSS	0	0	0	0	0	0	0	0	0	0
SG	0	0	0	0	0	0	0	0	0	0

Table 3. Abbreviations for ecological codes in Appendix 1. Lower case codes in parentheses are those assigned to taxa and used to calculate the group values (the codes in capitals in Table 2); OB is based on oa+ob; RT on rt+rd+rf, SA on sf+st+ss.

'certain' outdoor taxa	oa
probable outdoor taxa	ob
aquatic taxa	w
damp ground/waterside taxa	d
strongly plant-associated taxa	p
wood-associated taxa	l
generalist decomposer taxa	rt
'dry' decomposer taxa	rd
'foul' decomposer taxa	rf
facultatively synanthropic taxa	sf
typically synanthropic taxa	st
strongly synanthropic taxa	ss

Appendix. Lists of invertebrate taxa recorded from the samples from Must Farm

For each sample assemblage the adult Hemiptera (bugs) and Coleoptera (beetles) are listed first, followed by the remaining invertebrates. The taxa are listed in descending rank order. Headers: weight is in kilogrammes; E – mode for erosion; F – mode for fragmentation (following Kenward and Large 1998); ec - ecological codes; n = minimum number of individuals (e – estimate of a large number; m – ‘many’, translated as 15; s – ‘several’, translated as 6); ReM – recording method (s – semiquantitative). For translation of ecological codes, see Appendix 2. Nomenclature follows Kloet and Hincks (1964-1967). Latin names are not italicised in this table, which is generated from a database.

Context: 356 Sample: 126/T ReM: S

Weight: 2.00 E: 3.50 F: 3.50

Notes: Re-entered HK 13-10-09. Rather stiff, slightly brittle, perhaps indurated at some stage (dried out). Quite moist humic clay, dark grey with orange patches. Some white flecks (?mollusc shell).

Hydrophilinae sp.	2	-	oa-w
Ochthebius sp.	2	-	oa-w
Scirtidae sp.	2	-	oa-d
Corylophus sp.	2	-	rt
Donaciinae sp. A	2	-	oa-d-p
Tanysphyrus lemnae	2	-	oa-w-p
?Microvelia sp.	1	-	oa-w
Delphacidae sp.	1	-	oa-p
Pterostichus sp.	1	-	ob
Amara sp.	1	-	oa
Hydroporinae sp. A	1	-	oa-w
Hydroporinae sp. B	1	-	oa-w
Agabus or Ilybius sp.	1	-	oa-w
Gyrinus sp.	1	-	oa-w
Hydrochus sp.	1	-	oa-w
Helophorus sp. A	1	-	oa-w
Helophorus sp. B	1	-	oa-w
Cercyon sp.	1	-	u
Hydrobius fuscipes	1	-	oa-w
Hydrophilus piceus	1	-	oa-w
Hydraena sp.	1	-	oa-w
Proteinus sp.	1	-	rt
Omalium sp.	1	-	rt
Xantholinus sp.	1	-	u
Staphylininae sp.	1	-	u
Aleocharinae sp.	1	-	u
Aphodius sp.	1	-	ob-rf
Phyllopertha horticola	1	-	oa-p
Dryops sp.	1	-	oa-d
Nitidulidae sp.	1	-	u
Donaciinae sp. B	1	-	oa-d-p
Prasocuris phellandrii	1	-	oa-p-d
Chaetocnema concinna	1	-	oa-p
Apion sp. A	1	-	oa-p
Apion sp. B	1	-	oa-p
Apion sp. C	1	-	oa-p
Sitona sp.	1	-	oa-p
Coleoptera sp.	1	-	u
*Acarina sp.	15	s	u

*Cristatella mucedo (statoblast)	15	m	w
*Daphnia sp. (ephippium)	6	s	oa-w
*Lophopus crystallinus (statoblast)	6	s	oa-w
*Chironomidae sp. (larva)	2	-	w
*Hymenoptera Parasitica sp.	2	-	u

Context: 357 Sample: 127/T ReM: S

Weight: 2.00 E: 3.00 F: 4.00

Notes: Re-entered with some corrections HK 15-10-09. Dark grey silty clay, orange patches, abundant mollusc shell, charred twigs. Moist. Couple of Chara. Many fossils could not be named as so fragmentary (e.g. Bembidion spp., Carabidae spp., Aphodius spp.)

Ochthebius minimus	15	m	oa-w
Oulimnius sp.	15	m	oa-w
Anotylus rugosus	3	-	rt
Corylophus sp.	3	-	rt
Donacia sp.	3	-	oa-d-p
Trechus obtusus or quadristriatus	2	-	oa
Bembidion ?doris	2	-	oa-d
Cercyon sp.	2	-	u
Hydrophilinae sp. A	2	-	oa-w
Platystethus ?nodifrons	2	-	oa-d
Stenus sp. C	2	-	u
Xantholinus longiventris	2	-	rt-sf
?Gabrius sp.	2	-	rt
Phyllopertha horticola	2	-	oa-p
Dryops sp.	2	-	oa-d
Apion sp.	2	-	oa-p
Sitona lepidus	2	-	oa-p
Ceutorhynchus sp.	2	-	oa-p
Delphacidae sp.	1	-	oa-p
Blethisa multipunctata	1	-	oa-d
Bembidion sp. A	1	-	oa
Bembidion sp. B	1	-	oa
Bembidion sp. C	1	-	oa
Bembidion sp. D	1	-	oa
Carabidae sp. A	1	-	ob
Carabidae sp. B	1	-	ob
Carabidae sp. C	1	-	ob
Haliphus sp.	1	-	oa-w
Hydroporinae sp.	1	-	oa-w
Agabus or Ilybius sp.	1	-	oa-w
Gyrinus sp.	1	-	oa-w
Hydrochus sp.	1	-	oa-w
Helophorus sp. A	1	-	oa-w
Helophorus sp. B	1	-	oa-w
Coelostoma orbiculare	1	-	oa-w
Hydrobius fuscipes	1	-	oa-w
Hydrophilus piceus	1	-	oa-w
Hydrophilinae sp. A	1	-	oa-w
Hydraena testacea	1	-	oa-w
Carpelimus sp.	1	-	u
Stenus sp. A	1	-	u
Stenus sp. B	1	-	u
Rugilus sp.	1	-	rt
Philonthus sp.	1	-	u
Tachinus sp.	1	-	u
Aleocharinae sp. A	1	-	u
Aleocharinae sp. B	1	-	u
Geotrupes sp.	1	-	oa-rf
Aphodius sp. A	1	-	ob-rf
Aphodius sp. B	1	-	ob-rf

Aphodius sp. C	1	-	ob-rf
Aphodius sp. D	1	-	ob-rf
Heteroceris sp.	1	-	oa-d
Elateridae sp.	1	-	ob
?Atomaria sp.	1	-	rd
Phalacrus sp.	1	-	oa-p
Donacia sp. B	1	-	oa-d-p
?Phaedon sp.	1	-	oa-p
?Hydrothassa sp.	1	-	oa-d-p
Prasocuris phellandrii	1	-	oa-p-d
Galerucella sp.	1	-	oa-p
Longitarsus sp.	1	-	oa-p
Chaetocnema arida group	1	-	oa-p
Chaetocnema concinna	1	-	oa-p
Notaris acridulus	1	-	oa-d-p
Ceuthorhynchinae sp.	1	-	oa-p
Anthonomus sp.	1	-	oa-p
?Rhamphus sp.	1	-	oa-p
*Daphnia sp. (ephippium)	15	m	oa-w
*Acarina sp.	15	m	u
*Cristatella mucedo (statoblast)	15	m	w
*Lophopus crystallinus (statoblast)	15	m	oa-w
*Cladocera sp. (ephippium)	6	s	oa-w

Context: 358 Sample: 129/T ReM: S

Weight: 2.00 E: 3.50 F: 4.00

Notes: Re-entered HK 15-10-09. Very heterogeneous, light yellowish grey to very dark brown, mm to cm scale variation. Clay through to sand, traces of ?mollusc shell and grit (mm scale - biggest 3-4mm, one piece cm scale). Moist. Hard orange clast left complete in residue bag - 3cm approx. Some Chara (stonewort). Identifications limited by fragmentation.

Oulimnius sp.	6	s	oa-w
Ochthebius sp.	2	-	oa-w
Delphacidae sp.	1	-	oa-p
Carabidae sp.	1	-	ob
Hydroporinae sp.	1	-	oa-w
Dytiscidae sp.	1	-	oa-w
Helophorus sp.	1	-	oa-w
Cercyon sp.	1	-	u
Hydrophilinae sp.	1	-	oa-w
Omalium sp.	1	-	rt
Bledius sp.	1	-	oa-d
Kateretes sp.	1	-	oa-p-d
Anthicus sp.	1	-	rt
Donaciinae sp. A	1	-	oa-d-p
Donaciinae sp. B	1	-	oa-d-p
Galerucella sp.	1	-	oa-p
Phyllotreta sp.	1	-	oa-p
Longitarsus sp.	1	-	oa-p
Chaetocnema sp.	1	-	oa-p
Tanysphyrus lemnae	1	-	oa-w-p
*Cristatella mucedo (statoblast)	15	m	w
*Daphnia sp. (ephippium)	6	s	oa-w
*Cladocera sp. (ephippium)	6	s	oa-w
*Acarina sp.	6	s	u
*Lophopus crystallinus (statoblast)	6	s	oa-w
*Thysanoptera sp.	1	-	oa

Context: 367 Sample: 130/T ReM: S

Weight: 2.00 E: 3.00 F: 3.00

Notes: Re-entered 15-10-09. Moist, mid-dark grey, orange patches, silt with immense numbers of molluscs, one wood fragment. Whole mussel shells, broke up on contact (2 in subsample). Several Chara.

Aleocharinae sp. A	3	-	u
Hydrochus sp.	2	-	oa-w
Hydraena testacea	2	-	oa-w
Aphodius sp. A	2	-	ob-rf
Kateretes sp.	2	-	oa-p-d
Drymus sp.	1	-	oa-p
Elaphrus cupreus	1	-	oa-d
Trechus quadristriatus	1	-	oa
Bembidion properans	1	-	oa
Bembidion sp. A	1	-	oa
Bembidion sp. B	1	-	oa
Carabidae sp. A	1	-	ob
Carabidae sp. B	1	-	ob
Haliphus sp.	1	-	oa-w
Hydroporinae sp.	1	-	oa-w
Agabus or Ilybius sp.	1	-	oa-w
?Dytiscus sp.	1	-	oa-w
Gyrinus sp.	1	-	oa-w
Helophorus sp.	1	-	oa-w
Megasternum obscurum	1	-	rt
Hydrobius fuscipes	1	-	oa-w
?Hydrophilus piceus	1	-	oa-w
Hydrophilinae sp.	1	-	oa-w
Ochthebius minimus	1	-	oa-w
Ochthebius sp.	1	-	oa-w
Hydraena sp.	1	-	oa-w
Metopsia retusa	1	-	u
Omaliinae sp.	1	-	rt
Platystethus nitens	1	-	oa-d
Anotylus nitidulus	1	-	rt
Anotylus rugosus	1	-	rt
Stenus sp.	1	-	u
Xantholinus longiventris	1	-	rt-sf
Philonthus sp.	1	-	u
Staphylininae sp.	1	-	u
Aleocharinae sp. B	1	-	u
Aphodius sp. B	1	-	ob-rf
Phyllopertha horticola	1	-	oa-p
Oulimnius sp.	1	-	oa-w
?Anthocomus rufus	1	-	oa
Atomaria sp.	1	-	rd
Donaciinae sp. A	1	-	oa-d-p
Donaciinae sp. B	1	-	oa-d-p
Prasocuris phellandrii	1	-	oa-p-d
Epitrix sp.	1	-	oa-p
Apion sp.	1	-	oa-p
Sitona sp.	1	-	oa-p
Tanysphyrus lemnae	1	-	oa-w-p
Notaris sp.	1	-	oa-d-p
Ceuthorhynchinae sp.	1	-	oa-p
Ceuthorhynchinae sp.	1	-	oa-p
*Acarina sp.	15	m	u
*Cristatella mucedo (statoblast)	15	m	w
*Daphnia sp. (ephippium)	6	s	oa-w
*Lophopus crystallinus (statoblast)	6	s	oa-w
*Chalcidoidea sp.	1	-	u

*Proctotrupoidea sp.	1	-	u
*Egg mass indet.	1	-	u

Context: 370 Sample: 128/T ReM: S

Weight: 2.00 E: 4.00 F: 4.00

Notes: Re-entered HK 15-10-09. Very many tiny fragments that could not be identified. Consequently lots more species than listed were certainly present. Very dense, dark grey silty clay with orange partings, ?marley patches, traces of plant debris. Some mollusc shell, very decayed wood - charred twig.

Oulimnius sp.	15	m	oa-w
Ochthebius minimus	5	-	oa-w
Corylophus sp.	5	-	rt
Tanysphyrus lemnae	3	-	oa-w-p
Bembidion (Philochthus) sp.	2	-	oa
Cercyon sp.	2	-	u
Megasternum obscurum	2	-	rt
Platystethus ?nitens	2	-	oa-d
Xantholinus sp.	2	-	u
Gabrius sp.	2	-	rt
Ceuthorhynchinae sp.	2	-	oa-p
Stygnocoris sp.	1	-	oa
Gerris sp.	1	-	oa-w
Elaphrus cupreus	1	-	oa-d
Dyschirius globosus	1	-	oa
Bembidion lampros or properans	1	-	oa
Bembidion sp. A	1	-	oa
Bembidion sp. B	1	-	oa
Pterostichus ?minor	1	-	oa
Calathus sp.	1	-	oa
Amara sp.	1	-	oa
Carabidae sp. A	1	-	ob
Carabidae sp. B	1	-	ob
Carabidae sp. C	1	-	ob
Haliphus sp.	1	-	oa-w
Noterus sp.	1	-	oa-w
Hydroporinae sp. A	1	-	oa-w
Hydroporinae sp. B	1	-	oa-w
Hydroporinae sp. C	1	-	oa-w
Agabus or Ilybius sp.	1	-	oa-w
Gyrinus sp.	1	-	oa-w
Hydrochus sp.	1	-	oa-w
Hydrophilus piceus	1	-	oa-w
Hydrophilinae sp. A	1	-	oa-w
Hydrophilinae sp. B	1	-	oa-w
Hydraena testacea	1	-	oa-w
Hydraena sp.	1	-	oa-w
Ptenidium sp.	1	-	rt
Proteinus sp.	1	-	rt
Carpelimus sp.	1	-	u
Anotylus rugosus	1	-	rt
Anotylus sculpturatus group	1	-	rt
Stenus sp. A	1	-	u
Stenus sp. B	1	-	u
Lathrobium sp.	1	-	u
Habrocerus capillaricornis	1	-	rt
Aleocharinae sp. A	1	-	u
Aleocharinae sp. B	1	-	u
Aleocharinae sp. C	1	-	u
Geotrupes sp.	1	-	oa-rf
Aphodius sp. A	1	-	ob-rf
Aphodius sp. B	1	-	ob-rf

Aphodius sp. C	1	-	ob-rf
Phyllopertha horticola	1	-	oa-p
Cyphon sp.	1	-	oa-d
Dryops sp.	1	-	oa-d
Elateridae sp.	1	-	ob
Anobium sp.	1	-	l
Donaciinae sp. A	1	-	oa-d-p
Donaciinae sp. B	1	-	oa-d-p
Prasocuris phellandrii	1	-	oa-p-d
Chrysomelinae sp.	1	-	oa-p
Longitarsus sp.	1	-	oa-p
Epitrix sp.	1	-	oa-p
Chaetocnema concinna	1	-	oa-p
Apion sp. A	1	-	oa-p
Apion sp. B	1	-	oa-p
Sitona sp. A	1	-	oa-p
Sitona sp. B	1	-	oa-p
Sitona sp. C	1	-	oa-p
Hypera sp.	1	-	oa-p
Notaris acridulus	1	-	oa-d-p
Bagoinae sp.	1	-	oa-w
Ceutorhynchus sp.	1	-	oa-p
Coleoptera sp.	1	-	u
*Daphnia sp. (ephippium)	15	m	oa-w
*Cladocera sp. (ephippium)	15	m	oa-w
*Acarina sp.	15	m	u
*Cristatella mucedo (statoblast)	15	m	w
*Lophopus crystallinus (statoblast)	15	m	oa-w
*Trichoptera sp.	1	-	oa-w
*Bibionidae sp.	1	-	u
*Hymenoptera sp.	1	-	u

Context: 378 Sample: 89/1 ReM: S

Weight: 2.30 E: 2.00 F: 4.00

Notes: Input HK 6/10/09. Soft clay silt, primarily grey, externally oxidised browner. Some mollusc shells. Washed down easily. Recorded in flot and on filter paper. Quite a lot of very fragmented remains. E 1.5-2.5 mode 2.0 weak; F 2.5-5.0, mode 4.0 distinct.

Corixidae sp.	6	s	oa-w
Helophorus sp.	6	s	oa-w
Ochthebius minimus	6	s	oa-w
Plateumaris braccata	4	-	oa-d-p
Rhynchaenus quercus	4	-	oa-p
Helophorus aquaticus or grandis	3	-	oa-w
Cercyon sp.	3	-	u
Carpelimus sp. A	3	-	u
Cyphon sp.	3	-	oa-d
Bembidion sp. B	2	-	oa
Gyrinus sp.	2	-	oa-w
Hydrobius fuscipes	2	-	oa-w
Hydraena testacea	2	-	oa-w
Hydraena sp.	2	-	oa-w
Lesteva ?heeri	2	-	oa-d
Anotylus rugosus	2	-	rt
Stenus sp. A	2	-	u
Pselaphidae sp.	2	-	u
Oulimnius sp.	2	-	oa-w
Psammoecus bipunctatus	2	-	oa-d
Plateumaris ?affinis	2	-	oa-d-p
Tanysphyrus lemnae	2	-	oa-w-p
Drymus ?sylvaticus	1	-	oa-p

Gerris sp.	1	-	oa-w
Cicadellidae sp.	1	-	oa-p
Elaphrus cupreus	1	-	oa-d
Dyschirius globosus	1	-	oa
Clivina fossor	1	-	oa
Bembidion sp. A	1	-	oa
Pterostichus ?gracilis	1	-	oa-d
Pterostichus sp.	1	-	ob
Amara sp.	1	-	oa
Acupalpus sp.	1	-	oa
Odacantha melanura	1	-	oa-d
Dromius ?longiceps	1	-	oa-d
Carabidae sp. B	1	-	ob
Carabidae sp. C	1	-	ob
Halipus sp.	1	-	oa-w
Hygrotus inaequalis	1	-	oa-w
Hydroporinae sp. A	1	-	oa-w
Hydroporinae sp. B	1	-	oa-w
Hydroporinae sp. C	1	-	oa-w
Agabus or Ilybius sp.	1	-	oa-w
Rhantus sp.	1	-	oa-w
Colymbetes fuscus	1	-	oa-w
Dytiscus sp.	1	-	oa-w
Hydrochus sp.	1	-	oa-w
Laccobius sp. A	1	-	oa-w
Laccobius sp. B	1	-	oa-w
Hydrophilinae sp.	1	-	oa-w
Histerinae sp.	1	-	rt
Limnebius sp.	1	-	oa-w
Dropephylla sp.	1	-	u
Carpelimus sp. B	1	-	u
Platystethus nodifrons	1	-	oa-d
Stenus sp. B	1	-	u
Lathrobium sp.	1	-	u
Erichsonius cinerascens	1	-	oa-d
Philonthus sp. A	1	-	u
Philonthus sp. B	1	-	u
Gabrieus sp.	1	-	rt
Staphylininae sp.	1	-	u
Sinodendron cylindricum	1	-	l
Aphodius sp. A	1	-	ob-rf
Aphodius sp. B	1	-	ob-rf
Phyllopertha horticola	1	-	oa-p
Heterocerus sp.	1	-	oa-d
Dryops sp.	1	-	oa-d
Elateridae sp.	1	-	ob
Omosita depressa	1	-	u
Atomaria sp.	1	-	rd
Phalacrus sp.	1	-	oa-p
Corticaria sp.	1	-	rt-sf
Cisidae sp.	1	-	l
Anaspis sp.	1	-	ob
Donacia sp.	1	-	oa-d-p
Chrysolina menthastri	1	-	oa-p-d
Phaedon sp.	1	-	oa-p
Galerucella sp.	1	-	oa-p
Agelastica alni	1	-	oa-p
Longitarsus sp.	1	-	oa-p
Chaetocnema concinna	1	-	oa-p
Halticinae sp.	1	-	oa-p
Phyllobius pomaceus	1	-	oa-p
Bagous sp. s. lat.	1	-	oa-p-w
Notaris acridulus	1	-	oa-d-p

Ceutorhynchus sp.	1	-	oa-p
Ceuthorhynchinae sp.	1	-	oa-p
Limnobaris pilistriata	1	-	oa-p-d
*Insecta sp. (immature)	1000	e	u
*Ostracoda sp.	50	e	u
*Acarina sp.	6	s	u
*Trichoptera sp.	1	-	oa-w
*Pentatomidae sp. (nymph)	1	-	oa-p
*Aphidoidea sp.	1	-	u
*Lepidoptera sp. (pupa)	1	-	u
*Diptera sp. (adult)	1	-	u
*Coleoptera sp. (larva) A	1	-	u
*Coleoptera sp. (larva) B	1	-	u
*Hymenoptera sp.	1	-	u

Context: 380 Sample: 2/1 ReM: S

Weight: 2.40 E: 3.50 F: 4.00

Notes: Entered HK 6/10/09. Very shelly mid brown silt, locally ginger or lacking molluscs. One mammal skull (*Arvicola terrestris*). Hard to break down, much crushing needed, many lumps less than 1 cm remained at start of paraffinning. P1 f1-3; P2 f1-3. Some colour change towards pale. Recorded in flot, queries on filter paper. Large taxa very fragmented, and overall quite a large number of fossils to broken to identify or quantify.

Ochthebius minimus	3	-	oa-w
Oulimnius sp.	3	-	oa-w
Chartoscirta sp.	2	-	oa-w
Corixidae sp.	2	-	oa-w
Helophorus sp.	2	-	oa-w
Hydrophilinae sp. A	2	-	oa-w
?Aphrophora alni	1	-	oa-p
Cicadellidae sp.	1	-	oa-p
Bembidion sp.	1	-	oa
?Agonum sp.	1	-	oa
Noterus sp.	1	-	oa-w
Hydroporinae sp.	1	-	oa-w
Colymbetes fuscus	1	-	oa-w
Colymbetinae sp.	1	-	oa-w
Megasternum obscurum	1	-	rt
Berosus sp.	1	-	oa-w
Hydrophilinae sp. B	1	-	oa-w
Hydrophilinae sp. C	1	-	oa-w
Lesteva heeri	1	-	oa-d
Anotylus nitidulus	1	-	rt
Stenus sp.	1	-	u
Philonthus sp.	1	-	u
Staphylininae sp.	1	-	u
Aleocharinae sp. A	1	-	u
Aleocharinae sp. B	1	-	u
Aphodius sp.	1	-	ob-rf
Phyllopertha horticola	1	-	oa-p
Cyphon sp.	1	-	oa-d
Phalacrus sp.	1	-	oa-p
Corylophus sp.	1	-	rt
Prasocuris phellandrii	1	-	oa-p-d
Chrysomelinae sp.	1	-	oa-p
Phyllotreta nemorum group	1	-	oa-p
Apion sp.	1	-	oa-p
Tanysphyrus lemnae	1	-	oa-w-p
Notaris scirpi	1	-	oa-d-p
Ceuthorhynchinae sp.	1	-	oa-p
?Gymnetron sp.	1	-	oa-p

Curculionidae sp.	1	-	oa
*Insecta sp. (immature)	100	e	u
*Cristatella mucedo (statoblast)	50	e	w
*Gastropoda sp.	16	m	u
*Sphaeridiinae sp.	16	m	u
*Ostracoda sp.	15	m	u
*Chironomidae sp. (larva)	15	m	w
*Trichoptera sp. (case)	6	s	oa-w
*Acarina sp.	6	s	u
*Egg mass indet.	2	-	u
*Sialis sp.	1	-	oa-w
*Daphnia sp. (ephippium)	1	-	oa-w

Context: 382 Sample: 4/1 ReM: S

Weight: 2.50 E: 2.00 F: 4.00

Notes: Input HK 6/10/09. Processed material was mostly one large lump of plastic clay, which had to be cut up with a knife. Dark grey-brown. Had to use force to break down almost all of the sediment. P1 1-3; P2 1-3. 4-dish flot, plant fragments and abundant invertebrate remains. Beetles and bugs very fragmented, though probably not all damage done in processing. Fragmentation limited identification in many cases. Recorded in flot and on filter paper, the latter in own tube. E 1.5-2.5, mode 2 weak; F 2.5-5.0, mode 4.0 weak. Strange black shiny globular thorax, to own tube.

Oulimnius sp.	7	-	oa-w
Corixidae sp.	6	s	oa-w
Ochthebius minimus	6	s	oa-w
Noterus sp.	3	-	oa-w
Hygrotus inaequalis	3	-	oa-w
Gyrinus sp.	3	-	oa-w
Hydrophilinae sp. A	3	-	oa-w
Bagoinae sp.	3	-	oa-w
Saldidae sp.	2	-	oa-d
Haliplidae sp.	2	-	oa-w
Hydrochus sp.	2	-	oa-w
Carpelimus sp.	2	-	u
Platystethus nitens	2	-	oa-d
Anotylus rugosus	2	-	rt
Cyphon sp. A	2	-	oa-d
Cyphon sp. B	2	-	oa-d
Phaedon sp.	2	-	oa-p
Pentatomidae sp.	1	-	oa-p
Rhyparochromus pini	1	-	oa-p
Gerris sp.	1	-	oa-w
Corixa sp.	1	-	oa-w
Cicadellidae sp.	1	-	oa-p
Bembidion assimile	1	-	oa-d
Agonum obscurum	1	-	oa-d
Dromius sp.	1	-	oa
Carabidae sp. A	1	-	ob
Coelambus sp.	1	-	oa-w
Hydroporus sp.	1	-	oa-w
Agabus bipustulatus	1	-	oa-w
Rhantus sp.	1	-	oa-w
Colymbetes fuscus	1	-	oa-w
Dytiscus sp.	1	-	oa-w
Hygrotus versicolor	1	-	oa-w
Helophorus aquaticus or grandis	1	-	oa-w
Helophorus sp.	1	-	oa-w
Coelostoma orbiculare	1	-	oa-w
Cercyon sp.	1	-	u
Hydrobius fuscipes	1	-	oa-w
Laccobius sp.	1	-	oa-w
Hydrophilinae sp. B	1	-	oa-w

Hydraena testacea	1	-	oa-w
Hydraena sp.	1	-	oa-w
Aclypea opaca	1	-	ob-rt
Omalium caesum or italicum	1	-	rt-sf
Platystethus alutaceus	1	-	oa-d
Platystethus cornutus group	1	-	oa-d
Stenus sp. A	1	-	u
Stenus sp. B	1	-	u
Xantholinus sp.	1	-	u
Philonthus sp.	1	-	u
?Gabrius sp.	1	-	rt
Staphylininae sp.	1	-	u
Tachyporus sp.	1	-	u
Aleocharinae sp. A	1	-	u
Aleocharinae sp. B	1	-	u
Aleocharinae sp. C	1	-	u
Pselaphidae sp.	1	-	u
Geotrupes sp.	1	-	oa-rf
Aphodius ?ater	1	-	oa-rf
Aphodius prodromus	1	-	ob-rf
?Melolontha sp.	1	-	oa-p
Phyllopertha horticola	1	-	oa-p
Dryops sp.	1	-	oa-d
Normandia nitens	1	-	oa-w
Meligethes sp.	1	-	oa-p
Atomaria sp. A	1	-	rd
Atomaria sp. B	1	-	rd
Corylophus cassidoides	1	-	rt
Donacia sp. A	1	-	oa-d-p
Donacia sp. B	1	-	oa-d-p
Plateumaris sp.	1	-	oa-d-p
Chrysolina marginata	1	-	oa-p
Prasocuris phellandrii	1	-	oa-p-d
Galerucella sp.	1	-	oa-p
Longitarsus sp.	1	-	oa-p
Altica sp.	1	-	oa-p
Halticinae sp. A	1	-	oa-p
Halticinae sp. B	1	-	oa-p
Halticinae sp. C	1	-	oa-p
Tanysphyrus lemnae	1	-	oa-w-p
Ceuthorhynchinae sp.	1	-	oa-p
Curculionidae sp. A	1	-	oa
Curculionidae sp. B	1	-	oa
Scolytidae sp.	1	-	l
Coleoptera sp.	1	-	u
Coleoptera sp.	1	-	u
*Ostracoda sp.	100	e	u
*Insecta sp. (immature)	100	e	u
*Chironomidae sp. (larva)	15	m	w
*Acarina sp.	15	m	u
*Trichoptera sp. (larva)	2	-	oa-w
*Corixidae sp. (nymph)	2	-	oa-w
*Diptera sp. (puparium)	2	-	u
*Gastropoda sp.	2	-	u
*Cristatella mucedo (statoblast)	2	-	w
*Sialis sp.	1	-	oa-w
*Trichoptera sp.	1	-	oa-w
*Daphnia sp. (ephippium)	1	-	oa-w
*Diptera sp. (adult)	1	-	u
*Coleoptera sp. (larva)	1	-	u

Context: 457 Sample: 125/T ReM: S

Weight: 2.00 E: 4.00 F: 4.50

Notes: Re-entered HK 13/10/09. Poorly preserved but better than others. Moist, layered, heterogeneous, yellowish to mid/dark grey, mm scale. Flakes into layers, silty clay. Traces of mollusc shell and plant remains. ?insipient marl - calcium salts precipitated. Very difficult to break down, small amount covering bottom of bucket left whole.

Ochthebius ?minimus	6	s	oa-w
Donaciinae sp. A	6	s	oa-d-p
Corylophus sp.	3	-	rt
Megasternum obscurum	2	-	rt
Hydrophilinae sp.	2	-	oa-w
Hydraena sp.	2	-	oa-w
Aphodius sp.	2	-	ob-rf
?Atomaria sp.	2	-	rd
Delphacidae sp.	1	-	oa-p
Bembidion sp. A	1	-	oa
Bembidion sp. B	1	-	oa
Carabidae sp.	1	-	ob
Dytiscus sp.	1	-	oa-w
Helophorus sp.	1	-	oa-w
Hydrobius fuscipes	1	-	oa-w
Anotylus rugosus	1	-	rt
Stenus sp. A	1	-	u
Stenus sp. B	1	-	u
Stenus sp. C	1	-	u
Stenus sp. D	1	-	u
Lathrobium sp.	1	-	u
Aleocharinae sp. A	1	-	u
Aleocharinae sp. B	1	-	u
Aphodius sp. B	1	-	ob-rf
Phyllopertha horticola	1	-	oa-p
Scirtidae sp.	1	-	oa-d
Byrrhidae sp.	1	-	oa-p
Oulimnius sp.	1	-	oa-w
Atomaria sp. B	1	-	rd
Donaciinae sp. B	1	-	oa-d-p
Phaedon sp.	1	-	oa-p
Chaetocnema concinna	1	-	oa-p
Apion sp. A	1	-	oa-p
Apion sp. B	1	-	oa-p
Tanysphyrus lemnae	1	-	oa-w-p
Notaris acridulus	1	-	oa-d-p
?Thryogenes sp.	1	-	oa-p
Ceutorhynchus sp. A	1	-	oa-p
Ceutorhynchus sp. B	1	-	oa-p
Ceuthorhynchinae sp.	1	-	oa-p
Curculionidae sp.	1	-	oa
Coleoptera sp.	1	-	u
*Acarina sp.	15	m	u
*Cristatella mucedo (statoblast)	15	m	w
*Daphnia sp. (ephippium)	6	s	oa-w
*Lophopus crystallinus (statoblast)	6	s	oa-w