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**Technical report: Biological remains from excavations  
on the Leven-Brandesburton by-pass, N. Humberside**

by

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**Summary**

Deposits from prehistoric pits and Roman-British pits and ditches excavated at a site along the line of the Leven-Brandesburton by-pass, N. Humberside, were investigated for their content of plant and invertebrate remains. A small corpus of bone, largely hand-collected, was also examined.

The prehistoric features gave very few remains (mostly charcoal), of little bioarchaeological value, although the charcoal provided the basis for dating by radiocarbon assay, confirming the dates inferred from pottery.

Some of the ditch fills from the two phases of Romano-British occupation gave large assemblages of plant and invertebrate remains. On the basis of these remains, the settlements at Leven appear likely to have practised arable agriculture, probably with no more than a limited amount of livestock. The biota evoke a picture of a mosaic of herbaceous vegetation, including stands of nettles and other rank weeds (perhaps along the ditch margins), shorter communities (perhaps locally trampled), and cultivated soil.

Bone was sparse and poorly preserved very little of it was identifiable; it adds only a small amount of information about domesticates.

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## Technical report: Biological remains from excavations on the Leven-Brandesburton by-pass, N. Humberside

### Introduction

Deposits of neolithic to Romano-British date were excavated along the line of the Leven-Brandesburton by-pass in N. Humberside by the Humberside Archaeology Unit in 1992. An assessment of the potential of the site for bioarchaeological analysis was undertaken by the Environmental Archaeology Unit in 1993, using a selection of eight sediment samples and a small assemblage of hand-collected bone as the basis for prediction (Dobney *et al.* 1993). Most of the deposits excavated and sampled were fills of ditches and pits and, although preservation by anoxic waterlogging was evidently limited, and there were generally only very modest amounts of charred plant material, it was thought worthwhile to examine most of the samples available in an attempt to investigate the local environment and evidence for human activity in an area for which little was known, archaeologically.

### Methods

#### *Sediment samples*

Samples were inspected in the laboratory and a description of their lithology made using a standard *pro forma*. For most samples, subsamples of 1-3 kg were taken for analysis of macrofossils, following methods of Kenward *et al.* (1980; 1986). In most cases, too, a 'washover' was taken, to remove the less dense fraction. The flots or washovers were assigned a priority before the main phase of recording, but in the event all were scan-recorded (*sensu* Kenward 1992). Remains other than adult beetles and

bugs were often recorded semi-quantitatively on the scale 1, 2, 3, 'several' (about 4-9) and 'many' (more than about 10). Plant remains were recorded on a four-point scale (cf. Hall and Kenward 1990).

For all samples, a voucher of between 1 and 6 kg was retained (or the whole sample where no subsample was processed) and, for the larger samples, the remaining sediment was bulk-sieved to 1 mm (using a 500  $\mu$ m washover sieve).

Four of the samples from these excavations were employed in a student project (Lancaster 1994) investigating the effect of different degrees of harshness in disaggregation during processing. These extra subsamples are not considered here, although beetle and bug elytra from them were scanned for additional taxa.

#### *Vertebrate remains*

All of the very small assemblage of bone from these excavations was hand-collected or came from a few samples bulk-sieved during the post-excavation analyses to reduce their volume. All of this material was surveyed and recording carried out at an appropriate level.

### Results

#### *Sediment samples*

Details of the nature of the sediments, the investigations made and the results obtained are presented in this section. A consolidated

species list is given in Table 1 and some data pertaining to the plant macrofossils in Tables 2-4. Summary data for the main statistics for the beetle and bug assemblages from Leven are given in Table 5. Species lists and statistics for the individual assemblages of plant remains and of adult beetles and bugs are given in Appendix Tables A1-A4. A list of samples and context types is presented in Table A5.

### *Notes on insect identifications*

Many of the insect remains were fragmentary and for this reason posed difficulty in identification. More species were certainly present than represented in Table 1.

The record of two sclerites, probably from a single individual, of the grain weevil *Sitophilus granarius* in the flot from sample 288 (context 290), poses a particular problem. There is no inherent reason why *S. granarius* should not have been present in the Leven area during the Roman period. However, no other strong synanthropes were recorded, and no sample produced even weak hints of the kind of insect community which has come to be considered typical of intensive human occupation. There was no clear community of cereal weeds, so an introduction of the weevil with seed grain can hardly be entertained.

It is, unfortunately, possible that the weevil was a processing contaminant, for samples from another site at which grain pests were abundant were undergoing sieving at about the same time as the material from Leven and several sieves whose mesh partly broken away from the frame (leaving a space in which fossils might lodge) were detected soon afterwards.

A second, and equally reprehensible, possible source is in cereals used to feed chickens whose run abutted the area in which the samples from this site stood. In this connexion, it is worth noting that at least three records of hempseed (*Cannabis sativa*) were made from bulk-sieved samples; these, too, are thought to be contaminants, since the seeds were found in subsamples with an otherwise very poor flora and hempseed formed part of the chickenfeed. These problems serve to emphasise the dangers of storing

samples in polyethylene bags, whose splayed necks serve as funnels for all manner of contaminants. Samples in this series which had been stored in plastic tubs with close-fitting lids were free of these presumed contaminants (the use of tubs, now normal within the Humberside Archaeology Unit, is recommended by Dobney *et al.* 1992).

### *Vertebrate remains*

Hand-collected animal bone was recovered from a total of 57 contexts, but only five yielded more than 20 fragments. Although bone from all these contexts was scanned, the material from only 24 of them was recorded in any detail (Table 6). These represented all those contexts containing any identifiable fragments or those where there were ten or more unidentifiable fragments. The remaining 33 contexts produced mostly poorly preserved unidentifiable fragments, almost all producing no more than five fragments.

Preservation varied, although most of the material was very poorly preserved. It was characterised by extreme fragmentation, poor surface integrity, and the presence of numerous fragments showing what appeared to be advanced chemical erosion.

Although it is obvious that the assemblage from the site was dominated by cattle, some caprovid, pig and horse remains were also present (Table 6). Isolated teeth and slivers of enamel were the most commonly occurring elements; their predominance is usually taken to be indicative of severe preservational bias. In addition, measurable fragments, as well as mandibles containing teeth, were present only in very limited numbers.

The eight bulk-sieved samples, sorted quickly for animal bones, produced very little material. Preservation was very similar

to that of the hand-collected material, with bone appearing 'battered', very fragmented and consisting predominantly of unidentifiable fragments. Of note, however, was a single canid atlas (possibly fox) from context 258 (sample 374).

On the basis of its size, its obviously poor preservation, and broadly 'Romano-British' dating, the assemblage is unfortunately of very limited zooarchaeological significance and no substantive interpretative statements can be made.

#### *Sediment samples: results by phase and context*

In the following account, material is presented, within each archaeological phase and feature, by context. Descriptions included in the assessment report (Dobney *et al.* 1993) are marked †.

#### **Phase 1: Neolithic**

**Context 52** [fill of pit 53; depth: 0.26 m]

†Sample 61: Dark to mid brown, moist, crumbly sand with stones 2-20 mm. A total of 5 kg of this sample was sieved to 300 µm to obtain charcoal for <sup>14</sup>C dating.

The washover was found to contain, in addition to some charcoal fragments to about 10 mm, several fragments of hazel (*Corylus avellana*) nutshell. The latter were recovered for dating purposes (along with some of the charcoal, in case the sample of nutshell was too small). The charcoal included oak (*Quercus*) and ?rose family (Pomoideae). The washover also contained some germinating grass fruits, roots, several goosegrass (*Galium aparine*) fruits and single specimens of chickweed (*Stellaria media*) and corn spurrey (*Spergula arvensis*), all clearly modern. The charred material is not thought to be of recent origin, however. The residue consisted of sand and a little gravel. The material was not specifically examined for invertebrate remains.

The charred hazel nutshell fragment was dated at the Oxford University Radiocarbon Accelerator Unit as 5000±70 BP (OxA-4411).

**Context 778** [fill of pit 777; depth: 0.32 m]

†Sample 779: Dark gingery-brown, moist, unconsolidated sand with moderate numbers of stones to 25 mm. A 5 kg subsample was disaggregated to locate charcoal for <sup>14</sup>C dating.

The washover contained rather little charcoal (including probable hazel charcoal) and some fragments of hazel nutshell (submitted for dating). There were also some modern fumitory (*Fumaria*) and speedwell (*Veronica*) seeds. The residue was of quartz sand and gravel to 15 mm. The material was not examined for invertebrate remains.

The nutshell gave a radiocarbon date (OxA-4413) of 4855±70.

#### **Phase 1: Bronze Age**

**Context 173** [fill of pit 172, depth: 0.25 m]

†Sample 242: Light-mid yellow-grey-brown, moist, unconsolidated, slightly silty or clay sand with abundant angular flints. A 5 kg subsample was processed to obtain charcoal (in the event, sufficient was found from sample 243, see below, and no washover was taken).

The residue was mostly quartz sand with a little angular flint to 30 mm and rather a lot of iron-rich concretions in the >2 mm fraction (these appeared to have no organic content and may be 'an').

†Sample 243: Mottled grey-brown/pale orange-brown, moist, 'crisp' (brittle), slightly silty clay sand with abundant flints to 30 mm, and a trace of charcoal. Some localised small lumps of clay.

Charcoal for <sup>14</sup>C dating was sorted from the small washover from the 5 kg subsample; it included fragments of probable willow (cf. *Salix*), ash (*Fraxinus*) and oak, the largest being about 15 mm. The residue was sand and gravel, with a single fruit of annual knawel (*Scleranthus annuus*), a cornfield weed of sandy soils and perhaps a modern specimen.

The radiocarbon date from the charcoal submitted (OxA-4412) was 3240±65.

Neither of these samples was examined specifically for invertebrate remains.

### **Phase 1: Iron Age**

**Context 13** [lower fill of pit 10; depth: 0.80 m]

†Sample 14: Dark grey-brown to brown, locally pale orange-brown, moist, plastic, sticky sandy silty clay, locally more silty or clayey. The clay component of this sample hindered disaggregation, so dilute sodium pyrophosphate solution was used after an initial soaking in water to facilitate processing.

The washover from this 2 kg subsample consisted mainly of modern roots, and a little charcoal to 20 mm (mostly < 2 mm). On closer inspection, the latter was found to consist of charred herbaceous plant material rather than woody tissue. This included some fragments of rhizome or root. It is most likely to represent burnt grass, perhaps from turves or tussocks. The presence of rather frequent water-blisks (*Montia fontana*) seeds perhaps also suggests burning of short grass turf. The residue consisted mainly of quartz sand and a little gravel (to 10 mm), with a trace of iron-rich concreted material (?iron pan).

A second subsample (of 3 kg) was processed during the second phase of this project. Again, *Montia* seeds were present (in very small amounts), along with charred herbaceous detritus and a little charcoal to 10 mm, and some modern rootlets. There was an uncharred grass caryopsis, possibly heath-grass (*Danthonia decumbens*) which it is thought, on account of its dark colour, was a fossil contemporaneous with the charred remains and the *Montia*; also present were uncharred *Raphanus* or *Brassica* pod fragments which were very pale and likely to be modern contaminants from the ploughsoil above the pit fill. A little more charcoal, including some possible hazel nutshell, was recorded from the residue of this subsample, along with a little pottery; otherwise, this fraction consisted only of sand with a little gravel.

*Invertebrates:* The only remains recognised were two earthworm egg capsules.

A further subsample of 24 kg was bulk-sieved to 1 mm. The residue was mostly flint gravel to 25 mm with a little charcoal to 15 mm and pottery.

**Context 11** [upper fill of pit 10, depth: 0.30 m]

Sample 12: Mid yellow-grey-brown, crumbly (working slightly plastic), slightly clay sand with traces of stones 2-6 mm and abundant charcoal (apparently actually coal, see below).

There were only modest numbers of flakes of coal to 2 mm, and pre-Quaternary megaspores (from coal) in the small washover, together with some modern rootlets. The residue was of sand with a little gravel and coal, but no charcoal.

*Invertebrates:* The flot contained no recognisable insect remains.

Sample 15: Mid grey-brown (with slightly paler orange-brown mottles and dark grey patches), slightly crumbly (working plastic) clay (grey patches sandy), with stones (flints) 2-6 mm common and stones 6-20 mm present.

The washover from the 1 kg test subsample examined was very small and included modern rootlets with traces of charred organic material and ?coal to 2 mm, a *Montia fontana* seed fragment and a charred fragment of a fruit of *Bilderdykia convolvulus* (black bindweed). The small residue was of sand with a little gravel and a trace of charcoal to 5 mm.

*Invertebrates:* None were recovered.

**Context 68** [burnt fill of gulley 67; depth: 0.25 m]

Sample 88: Light/mid orange-brown (but somewhat varicoloured, including buff and mid grey), slightly crumbly (working plastic), sandy clay, with moderate amounts of charcoal.

The small washover from the 1 kg subsample examined contained rootlets with moderate numbers of coal flakes to 2 mm and pre-Quaternary megaspores (from coal); the residue was of sand with moderate amounts of gravel and a trace of coal to 10 mm.

*Invertebrates:* None were observed.

**Context 90** [lower fill of ditch 48; depth: 0.60 m]

Sample 143: Light/mid grey-brown (with some slightly darker grey and gingery brown areas), soft (working plastic), moderately stony, slightly clay sand, with moderate numbers of stones 2-6 mm and traces of stones 6-20 mm. A trace of pottery also present.

There was a tiny flint from the 1 kg subsample processed. It contained pre-Quaternary megaspores and traces of arthropod cuticle and unidentified herbaceous detritus. The residue was of sand and flint gravel with no organic material.

*Invertebrates:* None were present.

**Context 117** [upper fill of ditch 48]

Sample 85: Light/mid yellow-grey-brown, crumbly, slightly silty sand, with traces of stones 2-20 mm. No further analysis was undertaken.

**Context 125** [fill of gully 123; depth: 0.23 m]

Sample 157: Mid orange-brown, crumbly, soft, slightly silty sand, with traces of stones 2-60 mm. No further investigation undertaken.

**Phase 2: Romano-British (earliest C2)****Context 70** [fill of pit 69; depth: 0.18 m]

†Sample 71: Mid grey-brown to brown (?mottled), moist, crumbly to plastic, silty clay with a little burnt bone and a cobble to 150 mm; traces of modern roots and some fine charcoal.

The small washover from the 2 kg subsample consisted of modern roots together with charred 'seeds' of corn spurrey (2), buttercup (*Ranunculus* Section *Ranunculus*; 1) and sedge (*Carex* sp.; 1). The residue included modest amounts of very fragmentary bone and a little burnt ?daub. For the most part, though, the residue was of quartz sand and flints to 20 mm. Preservation of the bone was poor and specific identification was not possible. As with the hand-collected material (see below) a number of the fragments showed evidence of iron staining with

an even larger number showing evidence of burning, most being heavily calcined (and coloured white or blue). Processing a larger sample was felt to be unlikely to produce a useful assemblage. No more than a trace of invertebrate remains was present.

**Context 74** [lower, ashy, fill of pit 72; depth: 0.21 m]

Sample 78: Black (with buff flecks), crumbly silt with abundant charcoal.

A 0.25 kg subsample of this very small sample was processed. The washover and residue consisted of charcoal to 20 mm with traces of ?modern rootlets and a very little gravel.

*Invertebrates:* There were none.

**Context 73** [upper fill of pit 72; depth: 0.18 m]

Sample 79: Mid grey-brown/orange-brown (mottled, gleyed), crumbly (working plastic), slightly clay silt with traces of stones 2-20 mm. Traces of ?modern rootlets. No further investigation was undertaken.

**Context 444** [upper fill of ditch 443; depth: 1.26 m]

Sample 460: Mid grey-brown, crumbly (working plastic), sandy silty clay, with traces of stones 2-6 mm. No further investigation was undertaken.

**Phase 2/3/4: Romano-British (perhaps C2-4)****Context 405** [fill of ditch 404; depth: 1.12 m]

Sample 498: Slightly heterogeneous, mid/dark grey-brown, crumbly (working soft), slightly humic, slightly stony, slightly sandy silt with a little fine and coarse woody and herbaceous detritus and traces of stones 2-20 mm and patches of darker and paler grey-brown silt.

The moderately large flint from the 1 kg test subsample, together with the residue (which was about 50% woody and herbaceous detritus, the remainder sand and flint gravel) gave abundant

*Urtica dioica* achenes with large numbers of seeds of figwort (*Scrophularia* sp(p)), and moderate numbers of a variety of other taxa, including *Chaerophyllum temulentum*, *Torilis japonica*, *Stellaria media*, *Polygonum persicaria* and *Sambucus nigra*, and traces of several other taxa of waste places and cultivated soils. There were a few indicators of wetland habitats, too, notably *Ranunculus* Subgenus *Batrachium* and *Zannichellia*, and a rare record (for this site) of woody plant, in the form of a single alder (*Alnus glutinosa*) fruit and two stones of hawthorn (*Crataegus monogyna*). The Artemisietea community, with *Chaerophyllum*, *Marrubium*, *Arctium* and perhaps also the fairly frequent thistle (*Carduus/Cirsium*) and dock (*Rumex*) fruits, was conspicuous in this assemblage.

*Invertebrates:* Insects were abundant, and other invertebrates included immense numbers of *Daphnia* ephippia, large numbers of Ostracoda, and numerous midge (Chironomidae) larvae. Mites, too, were abundant. The assemblage of adult beetles and bugs numbered 125 individuals, with 87 taxa identified. Mathematically diverse, the assemblage was dominated by species associated with natural or semi-natural habitats (% N OB = 72), with aquatics very important (% N W = 34). Clearly this deposit formed in water, and the richness of the insect community suggests that this water stood for a long time, of the order of a year assuming that there were nearby sources of colonists, longer if colonisation was sporadic from more distant sources. The most numerous taxa were aquatics: *Tanytarsus lemnae* (9 individuals), a *Helophorus* species (8), and *Ochthebius minimus* (7). These and the other aquatics might be found today in still or sluggish water in drainage ditch, provided the water was not contaminated by fertilisers or pesticides.

Terrestrial beetles and bugs were indicative of moderately stable herbaceous vegetation such as might well occur along ditch margins, or in agricultural land, especially rough grazing. However, the insects gave no reason to suppose that this ditch was set in grazing land, for dung beetles were rare.

Decomposer insects formed an insignificant proportion of the assemblage (% N RT = 17), and absolute numbers were also small (N RT = 21). This component was estimated to be of unusually high diversity (compared with numerous other archaeological assemblages: alpha RT = 43,

although SE = 25), and so appears to have been of mixed origins, probably largely as a transported component.

The bulk-sieved residue from 53 kg of sediment remaining consisted for the most part of flint gravel and a few stones to 50 mm, with moderate amounts of wood fragments, some partly charred, and a little bone.

### **Phase 3: Romano-British (perhaps C3)**

**Context 290** [lower fill of ditch 201; depth: 0.99 m]

Sample 288: Very heterogeneous: Light/mid grey-brown plastic and crumbly (working plastic), slightly humic, sandy silt with fine and coarse woody and herbaceous detritus and moderate numbers of stones 2-6 mm, with patches of grey clay, brown detritus, buff flecks, and red-brown patches.

The plant assemblage from the very small washover and the residue (of which about 15% by volume was organic matter, including very decayed wood) from the 1 kg test subsample included abundant stinging nettle (*Urtica dioica*) achenes and moderate numbers of hemlock (*Conium maculatum*) and bur chervil (*Anthriscus caucalis*) mericarps, thistle (*Carduus/Cirsium*) achenes, chickweed (*Stellaria media*) seeds and *Sphagnum* leaves; the other taxa were mostly weeds of waste ground, amongst them white horehound (*Marrubium vulgare*) which, with *A. caucalis*, is something of an indicator of hedgebank and roadside communities today (see below, sample 270, for more discussion of these taxa). There were a few taxa suggestive of the presence of grassland, perhaps even that forming on leached, somewhat 'acid' soils (as in heathland).

*Invertebrates:* *Daphnia* ephippia and mites were rather abundant, and there were 'several' Chironomidae (midge) larvae and unidentified adult flies. Various other arthropods were present in small numbers. There was a single larva of the click beetle *Agrypnus murinus*.

Adult beetles and bugs were present in modest numbers (N = 44, S = 39). Rich in outdoor forms and poor in decomposers, this assemblage resembled in general terms most of the more substantial ones from the site. There were sufficient aquatics to suggest at least intermittent open water, something

strongly supported by the *Daphnia* and midges. It appears likely that there were nettles (*Urtica* sp.) nearby, since the most abundant taxon was *Brachypterus* sp. and there was a specimen of *Heterogaster urticae* (compare this with the very abundant nettle achenes from this deposit).

There were two sclerites of *Sitophilus granarius*, the grain weevil, in the flot. This species is well known from Roman Britain, but is in unlikely company at the present site, where synanthropic species are conspicuously rare. The remains may be processing contaminants. This problem is discussed above.

The bulk-sieved subsample of 17 kg was mostly flint gravel with traces of wood and twig fragments and of coal.

#### **Context 202** [upper fill of ditch 201; depth: 0.60 m]

Sample 263: Mid/dark grey-brown, crumbly (working very slightly plastic), moderately stony, slightly clay sand, with moderate numbers of flints 2-60 mm. No further investigation was undertaken.

Sample 270: Mid grey-brown (with a few slightly orange-brown patches), crumbly (working plastic), slightly stony clay sand with moderate numbers of flints 2-6 mm and traces of flints 6-20 mm.

The small washover from the 1 kg subsample processed consisted largely of plant detritus including propagules; preservation was rather variable (no doubt consistent with inwash of material into a ditch). The most frequent remains were achenes of *Urtica dioica* and nutlets of *Rumex*, with smaller numbers of *Conium* and a range of other weeds of neglected ground. Notable amongst them were *Anthriscus caucalis*, *Marrubium vulgare* and cat-nip (*Nepeta cataria*), all (and especially the two labiates) characteristic of 'waysides' or 'roadsides', though not exclusive to these habitats—they are rather strong indicators of the phytosociological class Artemisietea (biennial/perennial tall herb communities of waste places, including hedgebanks and roadsides). Other disturbed habitats are also indicated, however; greater plantain (*Plantago major*) and knotgrass (*Polygonum aviculare*) suggest trampled soils. Celery-leaved crowfoot (*Ranunculus sceleratus*) achenes suggest disturbed soils by water. The residue for this subsample was of sand with

moderate amounts of gravel.

*Invertebrates:* A very small group of remains was recovered, with single adult individuals of 17 beetle and bug taxa and a few other remains. This assemblage has the appearance of a random extract from fauna like that typical of the site, although some taxa not recorded from other samples were present.

The 18 kg subsample bulk-sieved to 1 mm gave a residue largely of flint gravel and some other stones to 50 mm; the tiny washover was rich in achenes of *Ranunculus sceleratus*.

Sample 271: Mid grey (with some orange-brown patches), crumbly, very stony, silty clay, with stones 206 mm common and traces of stones 6-20 mm.

The 1 kg subsample examined yielded a small washover which was mostly of plant detritus and seeds, though preservation was rather poor. *Urtica dioica* and *Chenopodium* Section *Pseudoblitum* were both abundant and there were modest numbers of *Ranunculus sceleratus* achenes, henbane (*Hyoscyamus niger*) seeds and *Conium* fruits. These suggest disturbed, nutrient-enriched soils. The small range of other taxa included some other weeds but the assemblage was small. The residue was of sand with a little gravel.

*Invertebrates:* Although *Daphnia* ephippia were abundant, other remains were rare. There were single adult individuals of 13 bug and beetle taxa, all typical of the site.

The bulk-sieved subsample of 25 kg gave a residue of flint gravel to 40 mm, with a trace of pottery.

#### **Context 351** [fill of sump 350; depth: 1.00 m]

†Sample 352: Mid-dark brown (with paler ±gingery to orange-brown patches), moist, crumbly, slightly clay sand with very decayed wood, flints to 15 mm, and pot to 20 mm.

The material processed during the assessment gave a rather large flot from paraffin flotation, which was rich in well-preserved floating seeds of elderberry (*Sambucus nigra*), with abundant *Urtica dioica* achenes and modest numbers of seeds of *Stellaria media* and *Hyoscyamus niger*. The remaining plant



taxa from this and from the washover (which otherwise consisted largely of very decayed wood) were mostly also weeds of disturbed and cultivated soils (very few of them typical cornfield weeds, however) with a small proportion of plants from wet habitats. No true aquatics were recorded, however.

Deposition does, nevertheless, appear to have occurred in water, which may have been only temporary; there were abundant resting eggs (ephippia) of water fleas (*Daphnia*) and a small number of aquatic beetles. The terrestrial insects indicated the presence of at least some decaying matter, which may only have been natural fallen vegetation and dung. Although there were some weakly synanthropic species, they offered no evidence for human dwellings. There was some evidence for disturbance, as with the plant assemblage, with beetles typical of waste ground and bare soil. The plant-feeders indicated the presence of nettles and crucifers. Insect preservation was rather good and it was considered that a useful assemblage would be recovered from a larger subsample.

The residue was of quartz sand and gravel to 20 mm.

A further subsample (of 3 kg) was examined in the second phase of this project. The assemblage of plant macrofossils from the small flot was dominated by elderberry seeds stinging nettle achenes, with moderate numbers of and annual nettle (*Urtica urens*) achenes and seeds or fruits of henbane, chickweed and knotgrass (*Polygonum aviculare* agg.). Also present were moderate numbers of pod fragments of wild radish (*Raphanus raphanistrum*), the only good indicator of arable land in the assemblage. There were small numbers of a range of other weed taxa, including *Marrubium vulgare* and *Conium maculatum*, together with a few wetland taxa (*Menyanthes*, *Hydrocotyle*) and some probable indicators of grassland (*Potentilla* cf. *erecta*, *Prunella vulgaris*, *Linum catharticum*).

*Invertebrates:* A large assemblages of beetles and bugs was recovered (N = 181, S = 105). There were also numerous ephippia of *Daphnia* and at least one other cladoceran, mites, and adult flies, and smaller numbers of a variety of other arthropods.

Despite the presence of the cladocerans, aquatic beetles were not particularly numerous (% N W = 4, 7 individuals). Damp ground or waterside forms were more abundant (% N D = 15, 28 individuals), although half of this group was contributed by

*Anotylus nitidulus* (the most abundant species in the assemblage), which perhaps originated in dung or similar material rather than in waterside mud. It thus appears likely that there was only intermittent pooling or flow of water. Plant feeders were abundant in absolute terms, although contributing only 20% of the individuals. They suggest mixed herbaceous vegetation including nettles (*Urtica* sp.), clovers or vetches, and crucifers. The rich and varied nature of the 'natural habitat' component suggests a fairly stable environment, with long-lived habitats allowing a diverse fauna to colonise. The insects suggest an environment modified by human activity, but not dominated by it—grazing land, perhaps, or arable fringes. Decomposers were rather abundant, and proportionally quite well represented for an assemblage clearly formed under at least semi-natural conditions (% N RT = 35). Diversity of this component was fairly low (alpha RT = 24, SE = 5), suggesting that the originated on the spot or at least nearby. The species recorded probably lived in natural litter and dung, however; there is no evidence of accumulations of decaying matter created directly by human activity, unless in cutting down plants and leaving them to decay where they fell.

A 43 kg subsample bulk-sieved to 1 mm gave a residue consisting mostly of flint gravel to 50 mm, with traces of bone, charcoal, coal and moderate amounts of wood fragments to about 100 mm, perhaps all modern tree roots.

#### **Context 716** [lower fill of ditch 715; depth: 0.60 m]

Sample 725: Dark grey-brown, crumbly, brittle (working soft to slightly plastic), moderately humic, very slightly sandy silt.

Two separate flots were taken from the 1 kg test subsample examined; there was a diverse flora in these and in the washover from the residue. *Urtica dioica* achenes were abundant amongst the plant remains, with very large numbers of *Chenopodium* Section *Pseudoblitum* seeds and *Ranunculus sceleratus* achenes. The remaining taxa included a small range of other probable weeds, with *Anthriscus caucalis* (discussed above) and several other weed taxa in moderate numbers. Notable and interpretatively contradictory were rare seeds of purging flax (*Linum catharticum*) and self-heal (*Prunella vulgaris*), indicators of short grassland habitats, and shoots of *Sphagnum* sp(p). and *Aulacomnium palustre*—mosses of acid peatland

habitats.

*Invertebrates:* Invertebrates were rather abundant; there were 96 adult individuals of 78 beetle and bug taxa, and a variety of other remains including large numbers of *Daphnia* ephippia and mites, 'many' midge (Chironomidae) larvae, 'several' ostracods, and four larvae of the click beetle *Athous haemorrhoidalis*.

The assemblage of adult beetles and bugs was estimated to be of very high mathematical diversity ( $\alpha = 193$ ,  $SE = 49$ ), although all or most of the taxa recorded may have originated in a restricted range of macrohabitats. The representation of ecological groups indicated aquatic deposition in an area of semi-natural herbaceous vegetation. The water was probably only intermittent. Although decomposers accounted for 32% of the individuals, only natural litter and perhaps a little dung are indicated.

A 21 kg subsample processed by bulk-sieving yielded a residue of flint gravel to 30 mm, with moderate amounts of poorly preserved bone and traces of charcoal (to 10 mm), coal, and twig fragments. The small washover was rich in *Urtica dioica* and *Ranunculus sceleratus* achenes with a few *Chenopodium* Section *Pseudoblitum* seeds. There was also a single sloe (*Prunus spinosa*) fruitstone which had been holed by a small mammal.

#### **Phase 3/4: Romano-British (perhaps C3-4)**

**Context 370** [fill of ditch 369; depth: 0.26 m]

Sample 391: Mid grey-brown, crumbly, moderately stony sand with moderate numbers of flints 2-20 mm (and with occasional orange-brown clay patches and brown sand). A large woody root fragment, presumably recent, was also present.

The 1 kg subsample examined gave one of the largest assemblages of plant remains for this site. Amongst the herbaceous detritus and decayed wood fragments were large numbers of *Urtica dioica* achenes with moderate numbers of *Anthriscus caucalis*, *Sambucus nigra* and annual nettle (*Urtica urens*). Also present were *Marrubium vulgare* and rough chervil (*Chaerophyllum temulentum*), both suggestive of hedgebank or wayside vegetation. Besides a variety of other weeds of waste ground

and cultivated soils there were some peatland/waterside taxa—bogbean (*Menyanthes trifoliata*), *Sphagnum* (very decayed leaves) and bristle scirpus (*Scirpus setaceus*). The residue was of sand with moderate amounts of gravel and some modern tree root to 15 mm diameter.

*Invertebrates:* A modest-sized group of beetles and bugs ( $N = 54$ ,  $S = 48$ ) and various other invertebrates including 'many' *Daphnia* ephippia and beetle larvae, and 'several' fly puparia and adults and ants, was recovered. The main statistics of the beetle and bug assemblages were typical of the site (allowing for the small number of individuals on which they are based). Deposition was presumably where there was intermittent standing water, and the surroundings included semi-natural herb communities presumably maintained by human activity such as running grazing animals or cutting of the vegetation.

#### **Phase 4: Romano-British (late C4)**

**Context 258** [fill of ditch 257; depth: 1.50 m]

Sample 374: Mid/dark grey-brown, crumbly (working plastic), slightly stony, clay silt, with traces of stones 2-6 mm and iron pan or ferruginous concretion present.

The flot and residue from the 1 kg test subsample from this sample was much less rich in plant taxa than that from 375 (see below), though the character of the assemblage was much the same. *Marrubium* and *Anthriscus caucalis* were again present and *Urtica dioica* was the most frequent taxon (though only present in moderate numbers).

*Invertebrates:* Only *Daphnia* ephippia were at all abundant ('many'); there were single individuals of 24 beetle and bug taxa, some beetle larvae, and very little else. Allowing for assemblage size, the main statistics were close to the norm for the site. The species list, too, was typical of the material from Leven. Preservation was poor, so that identifications were difficult, and further remains may have disappeared completely.

The residue from the 23 kg subsample bulk-sieved to 1 mm consisted mostly of flint gravel with moderate amounts of iron-concreted sand and gravel and traces of charcoal, wood and twig fragments and bone.

Sample 375: Dark grey-brown, plastic to slightly crumbly (working plastic), moderately stony, sandy clay silt with moderate numbers of stones 2-6 mm and traces of stones 6-20 mm. Some modern moss growing on surfaces.

The small flot from the 1 kg test subsample examined contained some quite well preserved weed seeds, mainly *Urtica dioica*, *Stellaria media* and *Chenopodium* Section *Pseudoblitum*, but with *Conium*, *Urtica urens*, docks and thistles, *Marrubium* and *Anthriscus caucalis*, as in several other samples from these Romano-British ditch fills. The residue yielded traces of possible peat in lumps to 15 mm, *Sphagnum* leaves, and a possible sweet gale (*Myrica gale*) fruit, all suggestive of the presence of peatland material, most probably reworked locally.

*Invertebrates*: In addition to a moderately large group of beetles and bugs (N = 96, S = 78) there were various other invertebrate remains, with very large numbers of *Daphnia ephippia* (water flea resting eggs), 'many' mites and larval head capsules of chironomid flies and 'several' ostracods and fly pupae, perhaps of the same group. Chironomid midges usually reproduce in water.

Over half of the species and individuals of beetles and bugs were 'outdoor' forms (% N OB = 51), with appreciable numbers of aquatics (% N W = 14) and damp ground/waterside forms (% N D = 10). Plant feeders were well represented (% N P = 20), and about third of the fauna was contributed by decomposers, mostly taxa with a wide habitat spectrum. The decomposer group was of rather high diversity (alpha RT = 41, although SE = 17) and may have included a component which had dispersed naturally from habitats over a wide area. There was no evidence for human presence or activity beyond creating the ditch and maintaining the surrounding vegetation as herbaceous.

The 19 kg bulk-sieved subsample gave a residue of flint gravel to 40 mm, with traces of bone and wood.

**Context 358** [charcoal fill of pit 357; depth: 0.21 m]

†Sample 367: More or less mottled, pale orange-brown/mid grey-brown, moist, crumbly

(unconsolidated) clay sand with modest amounts of charcoal and stones to 30 mm.

The tiny washover comprised modern roots with a few seeds, apparently of modern origin (one fat-hen, *Chenopodium album*; several *Brassica* testas, ?rapeseed). The residue contained a little charcoal to 20 mm, but was mostly sand and gravel, the latter with rounded sandstones and angular flints. There were no invertebrates

**Context 401** [fill of gully 400; depth: 0.32 m]

Sample 727: Mid grey-brown (with occasional buff flecks), crumbly (working slightly plastic), slightly clay sand with traces of stones 2-20 mm.

The washover from the 1 kg subsample examined gave only traces of two probable weed taxa and of a plant of wet places—not an interpretable assemblage; the residue was of sand with some gravel and iron-rich concreted material to 5 mm.

*Invertebrates*: None were found in the processed subsample.

### **Phase 6: Romano-British (late C4)**

**Context 100** [fill of slot 99; depth: 0.15 m]

Sample 110: Mid yellow-brown, crumbly, very slightly clay sand, with traces of stones 2-20 mm (gingery rotted sandstone) and greyish, more clay-rich lumps. No further investigation undertaken.

**Context 337** [fill of depression 373; depth: 0.40 m]

Sample 673 (lowermost): Mid/dark grey-brown (slightly darker within larger lumps), brittle (working crumbly), slightly stony, slightly silty sand, with traces of stones 2-6 mm.

The very small washover produced only very poorly preserved remains of two probable weed taxa, perhaps brought down from modern ploughsoil; the residue was of sand with some flint gravel to 30 mm and a few rounded stones. The residue from the bulk-sieved subsample of 18 kg was mostly flint to 30 mm with a few sandstone pebbles to 35 mm, with traces of very poorly preserved bone, pottery and charcoal and a little iron-concreted sediment.

*Invertebrates:* None were recorded.

Sample 383 (middle): Dark grey-brown (with occasional buff flecks), crumbly, slightly stony sandy silt with traces of stones 2-20 mm.

Three probable weed taxa were recorded from the very small washover from the 1 kg subsample examined; they may have originated in modern ploughsoil. There was also a trace of charred organic matter and coal to 2 mm. Sand and gravel made up the main part of the residue, with traces of charcoal to 10 mm. The 23 kg bulk-sieved subsample yielded a residue of flint gravel to 30 with one angular fragment of ?volcanic rock to 80 mm. There were traces of pottery and charcoal and ?iron-rich concretion.

*Invertebrates:* None were found.

Sample 382 (uppermost): Dark grey-brown to light/mid brown, crumbly (working soft), silty sand, with traces of stones 2-6 mm.

There were moderate numbers of poorly preserved corn spurrey (*Spergula arvensis*) seeds in the very small washover from the 1 kg subsample examined but otherwise only traces of three other taxa of no particular interpretative value. Sand was abundant in the residue with moderate amounts of gravel to 30 mm. Gravel made up the greatest part of the residue from bulk-sieving of 20 kg of this sample; with it were traces of charcoal, poorly preserved bone and pottery, with some iron-concreted sediment and ?daub.

*Invertebrates:* None were recorded.

**Context 493** [burnt fill of pit 492; depth: 0.48 m]

Sample 497: About equal amounts of buff and dark grey crumbly to soft (working slightly plastic), slightly stony silty sand, with traces of stones 2-20 mm and much very fine charcoal (in the darker parts).

The 1 kg subsample examined gave a very small washover with a few *Spergula arvensis* seeds, a *Polygonum aviculare* fruit and some modern rootlets and a modern legume (?*Trifolium*) seed. Pre-Quaternary megaspores (from coal) were present and the residue consisted of sand with some gravel to 20 mm.

*Invertebrates:* No invertebrate remains were seen.

**Context 541** [charcoal fill of pit 540; depth: 0.19 m]

Sample 546: Mid buff to mid grey-brown, crumbly, very slightly clay sand, with traces of stones 2-20 mm and much charcoal.

There was a small washover from the 1 kg subsample processed. It included traces of charred fern frond, perhaps bracken (*Pteridium aquilinum*), and charred herbaceous detritus which may have included sedge (*Carex*) stem and ?grass leaf or culm material. Otherwise, there were modern rootlets, a ?modern *Spergula arvensis* seed and a little charcoal to 10 mm. The residue was of sand with much flint gravel to 15 mm and a little more charcoal.

*Invertebrates:* None found.

**Context 544** [fill of construction slot 545; depth: 0.26 m]

Sample 566: Mid/dark grey-brown (with flecks of yellow and orange), crumbly (working very slightly plastic), moderately stony, slightly clay silty sand, with moderate numbers of stones 2-20 mm, moderate amounts of charcoal and a trace of very degraded bone.

A tiny washover was obtained from the 1 kg subsample examined; it included modern rootlets and ?root bark and a trace of very decayed bone; *Urtica dioica* achenes (in trace amounts) were the only identifiable plant remains. There were rather large amounts of pale orange, translucent, shiny, amorphous calcareous fragments less than 2 mm across whose origin could not be established. The residue was of sand with large amounts of gravel and a trace of charcoal.

*Invertebrates:* There were none in the processed subsample.

**Context 567** [fill of ditch 568; depth: 0.36 m]

Sample 569: Dark grey, crumbly, moderately stony silty sand, with moderate numbers of flints 2-20 mm and traces of charcoal (perhaps much fine charcoal)

The tiny washover resulting from processing 1 kg of

this sample gave traces of charcoal and coal (with pre-Quaternary megaspores derived from it) and one or a few seeds of *Montia* (cf. two samples, 14 and 15, from the prehistoric pits), and fragments of *Chenopodium album* and *Spergula arvensis*. The residue was of sand with some gravel and a trace of charcoal.

*Invertebrates*: None observed.

**Context 696** [lower fill of pit 646; depth: 0.30 m]

Sample 697: Mid grey-brown (but with evidence of orange-brown oxidised areas), plastic to crumbly (working plastic and crumbly), slightly stony, silty sand with a local content of clay, traces of stones 2-6 mm and traces of humic material.

The tiny flot contained only a few scraps of ?root bark; the washover from the residue of sand and flint gravel consisted of a very small amount of charcoal to 20 mm, but included four charred wheat (*Triticum*) and/or barley (*Hordeum*) grains in a very poor state of preservation.

*Invertebrates*: There were none.

The 9 kg subsample bulk-sieved to 1 mm gave a residue of flint gravel to 40 mm with traces of charred twig fragments to 30 mm, ?daub, and iron-concreted soil.

**Phase 7: Romano-British (late C4)**

**Context 43** [fill of ditch 42; depth: 0.23 m]

Sample 107: Mid grey-brown (with dark orange-brown flecks), crumbly (working slightly plastic), slightly clay sand, with traces of flints and rotted ferruginous sandstone 2-60 mm.

There was a very small washover from the 1 kg subsample examined; it consisted of very decayed *Conium* fruit fragments in moderate numbers, with traces of two or three other probable weeds and some modern rootlets. There were traces of charcoal to 2 mm and of very decayed wood. The residue was of sand with traces of gravel to 10 mm and moderate amounts of iron-concreted sediment to 40 mm.

*Invertebrates*: Only a single, unidentifiable, beetle fragment was found.

**Context 47** [fill of ditch 46; depth: 0.43 m]

Sample 108: Light/mid buff-brown, with gingery flecks, crumbly, slightly stony, silty sand with traces of stones 2-20 mm.

Although it was not intended that further work should be carried out on this sample, a 12 kg subsample was bulk-sieved. The washover from this was tiny and consisted of a few very poorly preserved fragments of *Conium* fruits with *Urtica dioica* and *Spergula arvensis* and a modern *Viola* seed. There were traces of coal and charcoal to 2 mm and pre-Quaternary megaspores from the former. The residue was sand with traces of gravel to 50 mm and of iron-concreted sediment.

*Invertebrates*: None could be found.

**Context 55** [fill of ditch 54; depth: 0.73 m]

Sample 109: Mid grey-brown, crumbly (working slightly plastic), slightly stony, slightly clay sand, with traces of stones 2-20 mm. No further investigation undertaken.

**Context 95** [fill of ditch 94; depth: 0.40 m]

Sample 111: Light/mid slightly yellowish-brown, crumbly to slightly sticky, slightly stony clay sand, with traces of stones 2-20 mm. No further investigation undertaken.

**Context 97** [fill of ditch 96; depth: 0.70 m]

Sample 112: Mid/dark grey-brown, crumbly (working slightly plastic), moderately stony, slightly silty and clay sand, with traces of stones 2-20 mm including mid red-brown rotted fine-grained sandstone.

There were only very small numbers of identifiable plant remains in the tiny flot from the 1 kg subsample examined, essentially weeds of the kinds generally observed in these deposits. The residue was of sand and flint gravel with no organic component.

*Invertebrates*: There were none in the processed subsample.

The 11 kg bulk-sieved subsample yielded a residue rich in flint gravel to 50 mm, with traces of bone (including some teeth) and pottery; there were moderate amounts of iron-concreted sediment in clasts up to 40 mm.

### Context 317 [fill of ditch 316]

Sample 319 [lower fill, depth 2.22 m]: Mid grey-brown (with patches of mid yellow-brown), soft to crumbly (working slightly plastic), slightly stony silty sand with traces of stones 2-20 mm.

There was a rather large assemblage of plant remains from this lower fill in a washover from a 1 kg subsample which was rather large; preservation was sometimes rather poor, probably related to inwash. Indeed, terrestrial taxa were the most frequent, notably *Urtica dioica*, which was abundant, but also prickly sow-thistle (*Sonchus asper*), whose achenes were moderately common. The other taxa included a wide range of weeds and waterside species and included several *Marrubium* nutlets (discussed above). A seed of three-veined sandwort (*Moehringia trinervia*) may perhaps be considered with the group of plants of hedgebanks mentioned earlier, though it is characteristic of shaded areas in woodland and scrub where there is no cover from tall-growing herbaceous plants, such as in the interiors of hedges and woodland margins. There were perhaps one or two hints of the presence of grassland habitats, something which was generally extremely rare in these assemblages. The residue was small—mainly sand with traces of flint to 30 mm and a trace of charcoal.

*Invertebrates:* There were 61 individuals of 58 adult beetle and bug taxa, and other remains which included 'many' *Daphnia* ephippia. Only two beetle taxa were represented by more than one individual: *Brachypterus* sp. (3) and *Enicmus* sp. (2). *Brachypterus* species live on nettles (*Urtica*), and two other nettle-feeders were present. Much of the recorded fauna could have lived on ditch banks and the surroundings seem to have supported no more than herbaceous vegetation.

Sample 318 [upper fill, depth 0.6 m]: Dark grey-brown (with areas of buff and dark orange-brown), ±brittle to ±crumbly (working ±plastic), very stony, slightly clay sandy silt with flints 2-20 mm common and traces of charcoal.

The washover from the 1 kg subsample processed was small but consisted mostly of herbaceous detritus, including rootlets and moderate numbers of seeds, though these were rather decayed. Water crowfoot (*Ranunculus* Subgenus *Batrachium*) achene were abundant, indicating open water or water margins, and traces of duckweed (*Lemna* sp.) and toad-rush (*Juncus bufonius*) serve to support this interpretation. Otherwise, the small assemblage consisted of weeds or plants with rather unspecific ecological indications. The residue was of sand with a little gravel to 15 mm.

*Invertebrates:* There were few, and only single individuals of twelve beetle taxa were found. Allowing for the diminutive size of the assemblage, it was typical of the site.

### Context 336 [fill of ditch 335; depth: 1.50 m]

Sample 430: Mid/dark grey-brown, crumbly (working slightly plastic), very stony, slightly clay sandy silt with moderate numbers of stones 2-6 mm and traces of stones 6-20 mm. Some modern algae on outer surfaces.

There was a tiny washover from the 1 kg subsample processed and this included a few poorly preserved seeds of weed and other taxa recorded in quantity from many of the other contexts at this site. There were traces of charcoal to 10 mm and of pre-Quaternary megaspores (from coal). The residue was of sand with traces of gravel to 15 mm and some iron-concreted sediment in clasts to 20 mm.

*Invertebrates:* The only remains observed were of a single modern springtail (Collembola).

A 32 kg subsample processed by bulk-sieving gave a residue of flint gravel to 20 mm with large amounts of iron-rich concreted material to 25 mm (some in the form of moulds of worm burrows or root channels); there was also a trace of pottery.

†Sample 442: Dark grey-brown, moist, crumbly to plastic (when worked), slightly sandy clay silt with small stones to 20 mm (mostly flints), occasional patches of grey silt or clay, and areas of rather paler brown colour with a sandier texture; elsewhere more clay (i.e. the texture rather heterogeneous). On disaggregation, a considerable humic content was

apparent. The 2 kg subsample was subjected to paraffin flotation followed by washover. It was examined only in assessment.

The flot was very rich in well-preserved seeds, especially *Chenopodium* Section *Pseudoblitum*, and *Urtica dioica*, with modest numbers of *Stellaria media*, *Hyoscyamus niger* and *Conium maculatum*, black nightshade (*Solanum nigrum*), deadnettle (*Lamium* Section *Lamiopsis*), oraches (*Atriplex* sp(p)), prickly sow-thistle (*Sonchus asper*) and a range of other taxa, most of which are indicators of disturbed and cultivated soils, especially places with nitrification from organic waste, e.g. in farmyards or near dung-heaps. A few marsh and other wetland taxa were present, but no good indicators of standing water as such.

The insect assemblage from this subsample was broadly similar to that from sample 352 (context 351), with a rich, varied and well-preserved group of beetles. Aquatic invertebrates, including *Daphnia ephippia* (of which there were 'many') and a second water flea, were sufficiently numerous to indicate deposition in water, and an assortment of decomposers likely to have originated in litter and dung was also recorded. The few plant-feeders present may have originated from disturbed weedy ground of the kind suggested by the plant remains.

The residue consisted of quartz sand and gravel to 25 mm.

**Context 345** [fill of boundary ditch 344; depth: 0.70 m]

Sample 638: Mid grey (with slight brownish cast), soft (working slightly plastic), very stony, sandy clay silt, with moderate numbers of stones 2-6 mm and traces of stones 6-20 mm, and traces of ?iron pan.

The tiny washover from the 1 kg subsample processed gave moderate amounts of *Conium* fruit mostly as fragments and a small range of other taxa of kinds frequently encountered at this site but including spike-rush (*Eleocharis palustris*). The residue was of sand with moderate amounts of flint gravel to 20 mm and rare iron-rich concretions to 5 mm.

*Invertebrates*: There were none in the processed subsample.

Flint gravel (to 30 mm), with a little sandstone to 35 mm, made up the bulk of the residue from the 30 kg bulk-sieved sample; there were also traces of bone and some iron-concreted root channels or worm burrows.

**Context 436** [lower fill of pit 435; depth: 0.18 m]

Sample 782: Rather varicoloured (pinkish- and reddish-grey and -brown), slightly crumbly (working slightly crumbly), slightly sandy silty clay with traces of charcoal.

There was a small washover from the 1 kg subsample processed; apart from modern rootlets there was a little charcoal to 2 mm. The residue was sand with traces of flint gravel to 35 mm and moderate amounts of charcoal to 30 mm.

*Invertebrates*: None were recorded.

**Context 455** [burnt clay fill of pit 435; depth: 0.26 m]

Sample 491: Light/mid yellow-brown (with darker orange-brown and grey-brown patches), crumbly (working plastic), slightly sandy silty clay, with traces of flints 2-20 mm and much charcoal.

The small washover from the 1 kg subsample processed included some modern roots and rootlets and traces of charcoal to 5 mm. The only identifiable plant macrofossil was a *Stellaria media* seed which may have been recent in origin. The small residue was of sand with traces of gravel and charcoal (to 20 mm)

*Invertebrates*: None could be found.

**Context 458** [layer; depth: 0.20 m]

Sample 459: Mid grey-brown, crumbly (working slightly plastic), slightly clay, slightly silty sand with traces of stones 2-20 mm.

A very small washover was obtained from the 1 kg subsample processed; it included traces of *Spergula arvensis* and *Polygonum aviculare* (cf. samples from contexts 337 and 493, above) with a little charcoal to 15 mm and of coal to 2 mm. The residue was of sand with a few flints to 30 mm and some iron-concreted sediment in clasts to 5 mm.

*Invertebrates*: None were recorded apart from two *Daphnia ephippia* and a single fly pupa.

The bulk-sieved subsample from 20 kg was essentially flint gravel to 25 mm, with a little bone (partly charred) and a very rounded fragment of brick/tile to 25 mm. A range of weed taxa was recorded in the very small washover, including *Urtica dioica*, *Marrubium vulgare* and *Ranunculus sceleratus*.

**Context 639** [charcoal fill of pit 640; depth: 0.13 m]

Sample 645: Mid orangeish-grey-brown, crumbly to soft (working slightly plastic), slightly clay sand, with traces of flints 2-20 mm and traces of charcoal.

There was a tiny washover from the 1 kg subsample processed; it included moderate numbers of *Spergula arvensis* seeds and traces of several other probable weeds. There were also some modern rootlets. The residue was of sand with moderate amounts of gravel to 15 mm and traces of charcoal to 10 mm.

*Invertebrates*: There were only poorly-preserved single individuals of three beetle taxa; it appears likely that other remains had decayed entirely.

**Context 712** [fill of pit 711; depth: 0.05 m]

Sample 726: Mid buff to light grey-brown, crumbly (working plastic), sandy clay silt with traces of stones 2-20 mm and traces of charcoal.

There was a single (?modern) *Spergula arvensis* seed, a trace of rootlets and of charcoal to 5 mm in the small washover from the 1 kg subsample examined; the residue was of sand with traces of gravel to 10 mm and more charcoal to 5 mm.

*Invertebrates*: None were observed.

**Context 722** [charcoal fill of pit 721; depth: 0.37 m]

Sample 723: Rather varicoloured (buff to mid grey-brown to mid brown to slightly orange-brown), crumbly (working slightly plastic), sandy clay silt with traces of stones 2-20 mm and flecks of charcoal. Modern rootlets present.

The very small washover yielded modern rootlets and traces of charcoal to 2 mm. The residue was of sand with traces of gravel to 20 mm and moderate amounts of slightly ferruginous concretion to 10 mm and traces of charcoal to 10 mm.

*Invertebrates*: None recovered.

### ***Unphased: Romano-British***

**Context 680** [layer/fill over timbers 681; depth: 0.40 m]

Sample 682: Dark brown, crumbly, very humic, slightly sandy silt.

Two subsamples of this sample were processed as tests, one using a washover, the other a flot. The latter produced a very few plant remains but there were moderate numbers of oospores of Characeae (freshwater algae of clear, often calcareous water). The residue for this subsample was tiny, consisting of a few cm<sup>3</sup> of sand with about 20% by volume herbaceous detritus, mostly <1 mm. The plant material included moderate numbers of pondweed (*Potamogeton* sp(p.)) fruits and many more Characeae oogonia. Terrestrial taxa were represented by traces of raspberry (*Rubus idaeus*), elderberry and violet (*Viola* sp., probably one of the woodland or marsh species) and, intriguingly, traces of bud-scales of ?oak (cf. *Quercus*) and poplar/aspens (*Populus*).

*Invertebrates*: The only remains recovered were of single individuals of four beetle taxa. All were from natural or semi-natural habitats. Other remains may have decayed completely.

The bulk-sieved subsample of 18 kg gave a very small residue of flint gravel to 30 mm and some woody fragments which were probably roots, perhaps of post-depositional date. The very small washover obtained consisted mostly of rootlets which might have been post-depositional.

### **General characteristics of the biota**

This section considers, for the most part, the evidence from plant and invertebrate macrofossils from the sediment samples from these excavations, and concentrates on almost exclusively on the results from the



deposits dated to the 2nd to 4th centuries AD.

The content of biological remains in the samples from these excavations was very variable; many deposits were effectively barren of any remains other than a little wood charcoal, whilst others gave rich assemblages of plant and invertebrate macrofossils preserved by anoxic waterlogging. As remarked above, bone was rare and poorly preserved.

The general pattern was that the ditch fills often gave useful assemblages of plant and insect remains, whilst pit fills (and notably those of pre-Roman date) were almost invariably unrewarding. Where upper and lower levels in a ditch fill were sampled and analysed, the lower was, not surprisingly, usually richer than the upper. A striking feature of the plant and invertebrate assemblages was that, where they were of interpretatively useful size, they were rather uniform and characteristic.

The larger plant macrofossil assemblages were characterised by a predominance of weed taxa, mainly annual weeds of cultivated and other disturbed soils (phytosociological classes Chenopodietea and Secalinetea) and biennial and perennial herbs of waste places, roadsides and hedgebanks (group Artemisietea). Many of the latter—such as hemlock (*Conium maculatum*) and stinging nettle (*Urtica dioica*)—may have been growing on the sides of the ditches, and plants in the class Bidentetea (plants of nutrient-rich soils in damp places) may actually have been growing in them. However, there was otherwise a marked paucity of aquatics or aquatic-marginals; an exception was one of the two samples from context 317, which gave rather high scores for plants in POTA—floating leaved and submerged

aquatics—and the only record for *Lemna* (duckweed) for the site. There were amongst the plant taxa from the Romano-British samples as a whole perhaps only 5-6 taxa of standing water and 14-15 likely to have grown in marginal situations, nearly all recorded in very small amounts where they occurred. By contrast, there were some 54 taxa representing one or more of the ‘weed’ groups, and of these almost half were present at a score of 2 or more (on a four-point scale) in at least one assemblage.

The abundant *Daphnia* ehippia and the absence of highly developed aquatic insect communities from most of the ditch deposits suggests that the ditches did not generally carry permanent water. Of the assemblages large enough for any significance to be attached to their main statistics, only three had more than 10% of aquatics: those from contexts 258 (13 individuals, 14%), 405 (42, 34%) and 716 (11, 11%). The exceptional abundance of aquatics in the material from context 405 suggests that in this case there was long-lived standing water; this was probably of about neutral pH, and weedy, with the most abundant beetle (*Tanysphyrus lemnae*) being associated with duckweeds. This context did not, however, produce correspondingly significant numbers of aquatic plants.

Remains of aquatic molluscs were entirely lacking. This may, however, have been a function of the apparently very uncongenial preservational regime in these deposits for calcareous materials, rather than a failure of molluscs to colonise. The bone (see above) was sparse and extremely poorly preserved, and no terrestrial molluscs were found.

Vegetation types represented by moderate numbers of plant taxa, mostly present in small amounts, were grassland and woodland/scrub. Apart from some rather

large numbers of elderberry (*Sambucus nigra*) seeds in a few samples and occasional records for hawthorn (*Crataegus*) and blackthorn (*Prunus spinosa*), there were only single records for alder (*Alnus*) fruits and for poplar/aspens (*Populus*) and perhaps also oak (*Quercus*) buds or bud-scales—certainly not enough to suggest that there was more than a little scrub or perhaps hedges in the vicinity.

The insects certainly give no evidence for living trees or shrubs, and only two individuals of species associated with dead wood were recorded (*Melasis buprestoides* and ?*Anobium* sp.). This suggests that any areas of scrub or hedgerows which might be inferred from the plant remains were not immediately adjacent to the sites of deposition, local development of scrub, and eventually trees, presumably being suppressed directly or indirectly human activity.

Nettle feeders (*Brachypterus* sp., *Cidnorhinus quadrimaculatus* and *Heterogaster urticae*) were frequently present in small numbers and this correlates well with the plant evidence—stinging nettle was present in most samples and abundant in many (its achenes were recorded at a score of 4, the highest possible, from two of the ditch fills). Other plants indicated by phytophage insects were:

- Compositae (from *Apion onopordi*; perhaps feeding on thistles, *Carduus/Cirsium*, achenes of which were recorded in small amounts in several samples);
- *Salix* spp. (willows, from *A. minimum*);
- vetches or clovers (from *Sitona* spp.);

- crucifers (from *Ceutorhynchus erysimi*, *floralis* and *parvulus*);

- *Rumex* or *Polygonum* spp. (from *Gastrophysa viridula* and *Chaetocnema concinna*; remains from plants in these genera were widely recorded);

- *Lamium album* or *Ballota nigra* (from *Sehirus bicolor*).

A vegetation type represented by a few plant taxa but not seen amongst the insects was peatland. *Sphagnum* leaves or shoot fragments were recorded in moderate amounts in two samples (288 from context 290, and 725 from 716) and there were a few *Calluna* flowers in 725, too. One sample, 375 (context 258), even produced a few fragments of organic sediment which may have been peat. Some of the acidophilous taxa may have been present in areas of leached soils in vegetation that might be termed acid grassland rather than heathland *sensu stricto*. The peat may have originated in some local mire, now long since destroyed by cutting or draining.

One component of the plant assemblages—ARTE—shows striking similarities with assemblages from sites of similar date and type (rural, Romano-British) in the region: those from a site at North Cave, North Humberside (Allison *et al.* 1990) and Glebe Farm, South Humberside (Carrott *et al.* 1993). Data in Tables 3 and 4 show how prominent this group was at all three sites and certain taxa, especially the umbellifers *Chaerophyllum temulentum* and *Anthriscus caucalis* and the labiates *Marrubium vulgare* and *Nepeta cataria*, were present at both Leven and North Cave. Today very typical of hedgerows and roadside communities, these plants may have been growing in some kind of 'edge' vegetation at these sites, though the

presence of hedges with trees or shrubs at Leven is not substantiated by much archaeobotanical evidence and not at all by the insect data. It is noteworthy that two of these plants—*A. caucalis* and *C. temulentum*—were each abundant in at least one sample from Iron Age and Roman riverside deposits at Farmoor, Oxfordshire (Lambrick and Robinson 1979). *A. caucalis* was prominent in a sample from an Iron Age ditch, *C. temulentum* in a sample from a stone-lined Roman feature interpreted as a water-hole.

Evidence for human occupation, other than in the presence in abundance of plants of both weedy vegetation and of cultivated soils, was very limited in the plant assemblages. There was no evidence from the insects for the timber buildings inferred from the excavation record (K. Steedman, *in litt.* 15.3.94). Most of the plant taxa which might have been used as food (Table 2) were as likely to have been growing in waste places or scrub; none seem likely to have been cultivated in this context. There was a single record of charred cereal remains from a Phase 6 sample. The two taxa with known herbal uses (*Marrubium vulgare* and *Nepeta cataria*) were probably simply part of the local weedy vegetation.

There were no insects strongly indicative of human dwellings or the stalling of animals; a single record of the grain weevil *Sitophilus granarius* must be discounted as a likely contaminant (see above). The contrast with Robinson's evidence from Farmoor (Lambrick and Robinson 1979) is notable: at the Oxfordshire site there were several beetle species regarded as 'house fauna' (Kenward and Hall forthcoming) present in large numbers, particularly *Ptinus fur*, *Anobium punctatum* and *Lathridius minutus* group (as *Enicmus minutus* agg.), and there were small numbers of more strongly

synanthropic species, including the mealworm *Tenebrio molitor*.

Another edifying contrast is with the insect assemblages from ditches at the Roman military establishment at Ribchester, Lancashire (Large *et al.* 1994). Here, although aquatics were often important, synanthropic species were frequently immensely abundant, apparently having been introduced in dumps of stable manure. It might be argued that differences in attitude towards organic waste and the tendency of the military to reconstruct its forts at intervals are responsible for this contrast. Rural communities dependent upon farming would hardly dispose of valuable manure into ditches, especially if those ditches represented barriers to stock, essential drainage, or sensitive property boundaries, so that their maintenance was important. On the other hand, the Roman military doubtless had an embarrassment of stable manure, and may not always have had the kind of relationship with the local farming populace which would have encouraged its deployment on the fields. Returning to the Leven site, even allowing for these arguments it seems most unlikely that the typical 'house' fauna would be totally unrepresented in the assemblages (having been incorporated into the deposits by accident in some way) if there were dwellings close by.

The ground beetles cast some light on the nature of the surroundings of the Leven site. They may be grouped by habitat type as follows:

- confined to damp habitats—*Elaphrus cupreus*, *Loricera pilicornis*, *Pterostichus nigrita*, *P. vernalis* and *Bembidion biguttatum*;
- typical of meadows and grasslands,

although frequently found elsewhere—*Pterostichus cupreus*, *P. melanarius*, *Agonum dorsale* and *Calathus melanocephalus*;

- particularly in open places—*Bembidion obtusum*, *Calathus fuscipes*, *Agonum dorsale* and *Calathus melanocephalus*;

- *Pterostichus oblongopunctatus* is associated with woodland in much of its range but can be found in unwooded places.

These records serve to emphasise the essentially treeless nature of the landscape, probably with some areas of bare soil.

Taken as a whole, the evidence from the lithology and from the flora and insect fauna point to deposition in man-made cuts, principally ditches, which were infilling slowly. They were in most cases probably only intermittently wet and sedimentation may have been a combination of wind-blow, occasional run-off and slumping from the sides of the cuts. The surroundings supported a rather rich herbaceous flora, mainly indicative of disturbance of one kind or another—this may even have included colonisers of upcast from digging and possibly cleaning ditches—and a diverse community of insects, mostly likely to have been associated with this vegetation. Subjectively, the most plausible reconstruction is of ditches fringed by annual and perennial plant communities whose further successional development was inhibited by human activity. There were sometimes enough dung beetles to hint at the presence of grazing stock, but the evidence was insufficiently strong to suggest extensive grazing land.

The land into which the cuts were set may have supported arable agriculture (there was an appreciable component of cornfield

weeds, though of a rather limited range of taxa). Robinson (1983) discusses the reconstruction of arable/pastoral ratios from insect remains. A reading of his account underlines the slight importance of grazing at the Leven site. Robinson's report on the Iron Age and Roman material from Farmoor (Lambrick and Robinson 1979) illustrates the point very strongly: at that site, dung beetles, indicative of stock keeping, were extremely abundant in several of the samples.

The ecological consistency of the assemblages of plant and invertebrate macrofossils from Leven has been remarked upon. The biota very largely indicate early stages in vegetational succession, with annual and perennial weeds well represented. This might be for one of two reasons: either the fossiliferous deposits all represent the same, very short, period of time, or conditions at the site remained essentially constant over a long period. Given the archaeological evidence for two phases of occupation in the earlier and later Roman periods, it appears more likely that the vegetation was maintained in an essentially unchanging state by human activity. Were this not the case, at least some of the ditch fills should have reflected later stages in vegetational development in the surroundings.

One last comment concerns climate. The nettle bug, *Heterogaster urticae* was recorded from three samples. Its frequent occurrence in Roman and early medieval deposits in Yorkshire is taken as evidence of summer temperatures considerably higher than at the present (Addyman *et al.* 1976; Kenward and Hall forthcoming).

## Retention/disposal

Sample of sediment in which some preservation of plant and invertebrate remains in at least modest numbers was observed should be retained for further research as long as their quality of preservation can be maintained. These are samples 270 and 271 (context 202), 374 and 375 (258), 288 (290), 318 and 319 (317), 352 (351), 391 (370), 498 (405) and 725 (716). It would be difficult to justify the long-term storage of the other material.

## Archive

All paper and electronic archive material pertaining to the work described here is currently stored at the Environmental Archaeology Unit, University of York, along with samples of processed and unprocessed sediment, extracted plant and invertebrate fossils and the vertebrate remains.

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## References

Addyman, P. V., Hood, J. S. R., Kenward, H. K., MacGregor, A. and Williams, D. (1976). Palaeoclimate in urban environmental archaeology at York, England: problems and potential. *World Archaeology* **8**, 220-233.

Allison, E. P., Hall, A. R., Kenward, H. K., McKenna, B. and Robertson, A. (1990). Biological remains from excavations at North Cave, N. Humberside. *Ancient Monuments Laboratory Report* **105/90**.

Carrott, J., Hall, A., Kenward, H., Large, F. and Milles, A. (1993). *Plant and invertebrate remains from two fill contexts from a Romano-British pit at Glebe Farm, Barton-upon-Humber, S. Humberside (site code GFA92)*. Prepared for Humberside Archaeology Unit.

Dobney, K., Hall, A., Kenward, H. and Milles, A. (1993). *An assessment of 'environmental' samples and bone from excavations on the route of the Leven-Brandesburton by-pass (site code LEV92)*. Report to Humberside Archaeology Unit.

Kenward, H. K., Engleman, C., Robertson, A., and Large, F. (1986). Rapid scanning of urban archaeological deposits for insect remains. *Circaea* **3** (for 1985), 163-72.

Kenward, H. K. and Hall, A. R. (forthcoming). Biological evidence from Anglo-Scandinavian deposits at 16-22 Coppergate. *The Archaeology of York* **14** (7).

Kenward, H. K., Hall, A. R. and Jones, A. K. G. (1980). A tested set of techniques for the extraction of plant and animal macrofossils from waterlogged archaeological deposits. *Science and Archaeology* **22**, 3-15.

Kloet, G. S. and Hincks, W. D. (1964-77). *A check list of British insects*. Second edition. London: Royal Entomological Society.

Lambrick, G. and Robinson, M. (1979). Iron Age and Roman riverside settlements at Farmoor, Oxfordshire. *Oxfordshire Archaeological Unit Report 2/CBA Research Report* **32**.

Lancaster, S. (1994). *What are we doing to our beetles?* EAU Placement Student Project Report, March 1994.

Large, F., Kenward, H., Carrott, J., Nicholson, C. and Kent, P. (1994). Insect and other invertebrate remains from the Roman fort at Ribchester, Lancashire (site code RB89): Technical report. *Reports from the Environmental Archaeology Unit, York* **94/11**, 171 pp.

Smith, A. J. E. (1978). *The moss flora of Britain and Ireland*. Cambridge: University Press.

Tutin, T.G. *et al.* (1964-81). *Flora Europaea*. **1-5**. Cambridge: University Press.

*Table 1. Complete list of plant and invertebrate taxa recorded from samples from excavations on the Leven-Brandesburton by-pass. Latin binomials for plant taxa follow Tutin et al. (1964-80) and Smith (1978). Taxa marked \* were only recorded during the assessment of samples from these excavations. The parts of the plants recorded are also given; where not specified otherwise, all plant material was preserved by anoxic waterlogging. Order and nomenclature of Insecta follow Kloet and Hincks (1964-77). 'sp(p)' indicates probable additional taxon; 'sp(p). indet.' indicates may be (or includes) previously listed taxa. † against an ecological code indicates that there are reservations concerning its appropriateness. Ecological codes for plants and adult beetles and bugs are explained in Hall and Kenward (1990), tables 127-8 —Sehirus bicolor was only recorded from a single subsample examined as part of a student project.*

### Algae

Characeae (oogonia)

### Mosses (all leaf/leaves and/or shoot fragment(s))

*Sphagnum* sp(p).

*Sphagnum* sp(p).

*Aulacomnium palustre* (Hedw.) Schwaegr.

*Thuidium tamariscinum* (Hedw.) Br. Eur.

*Cratoneuron filicinum* (Hedw.) Spruce

*Drepanocladus* sp(p).

*Calliergon cuspidatum* (Hedw.) Kindb.

*Eurhynchium* sp(p).

cf. *Hypnum cupressiforme* Hedw.

*Rhytidiadelphus* sp(p).

*Hylocomium splendens* (Hedw.) Br. Eur.

### Vascular plants

Filicales	fern	charred and uncharred pinnule fragment(s)
<i>Pteridium aquilinum</i> (L.) Kuhn	bracken	stalk fragment(s) *pinnule fragment(s)
<i>Populus</i> sp(p).	poplar/aspen	bud(s) and/or bud-scale(s)
cf. <i>Myrica gale</i> L.	?bog myrtle/sweet gale	fruit(s)
<i>Alnus glutinosa</i> (L.) Gaertner	alder	fruit(s)
<i>Corylus avellana</i> L.	hazel	charred nut(s) and/or nutshell fragment(s)
cf. <i>Quercus</i> sp(p).	?oak(s)	bud(s) and/or bud-scale(s)
<i>Urtica dioica</i> L.	stinging nettle	achene(s)
<i>U. urens</i> L.	annual nettle	achene(s)
<i>Polygonum aviculare</i> agg.	knotgrass	fruit(s)
<i>P. persicaria</i> L.	persicaria/red shank	fruit(s)
<i>P. lapathifolium</i> L.	pale persicaria	fruit(s)
<i>Bilderdykia convolvulus</i> (L.) Dumort.	black bindweed	fruit fragment(s)
<i>Rumex acetosella</i> agg.	sheep's sorrel	fruit(s)
<i>Rumex</i> sp(p).	docks	uncharred and charred fruit(s)
Chenopodiaceae	goosefoot family	seed(s)
<i>Chenopodium</i> Section <i>Pseudoblitum</i>	red goosefoot etc.	seed(s)
<i>C. album</i> L.	fat hen	seed(s)
<i>Atriplex</i> sp(p).	oraches	seed(s)
<i>Montia fontana</i>		
ssp. <i>chondrosperma</i> (Fenzl) Walters	blinks	uncharred and charred seed(s)

<i>Moehringia trinervia</i> (L.) Clairv.	three-nerved sandwort	seed(s)
<i>Stellaria media</i> (L.) Vill.	chickweed	seed(s)
<i>S. graminea</i> L.	lesser stitchwort	seed(s)
<i>Stellaria</i> sp(p).	stitchworts	seed(s)
<i>Cerastium</i> sp(p).	mouse-ear chickweeds	seed(s)
* <i>Scleranthus annuus</i> L.	annual knawel	fruits(s)
<i>Spergula arvensis</i> L.	corn spurrey	seed(s)
<i>Silene vulgaris</i> (Moench) Garcke	bladder campion	seed(s)
<i>S. alba</i> (Miller) Krause in Sturm	white campion	seed(s)
<i>Ranunculus</i> Section <i>Ranunculus</i>	meadow/creeping/bulbous buttercup	achene(s)
<i>R. sardous</i> Crantz	hairy buttercup	achene(s)
<i>R. sceleratus</i> L.	celery-leaved crowfoot	achene(s)
<i>R. flammula</i> L.	lesser spearwort	achene(s)
<i>R.</i> Subgenus <i>Batrachium</i>	water crowfoots	achene(s)
<i>Papaver argemone</i> L.	long prickly-headed poppy	seed(s)
Cruciferae	cabbage family	seed(s)
<i>Descurainia sophia</i> (L.) Webb ex Prantl	flixweed	seed(s)
<i>Thlaspi arvense</i> L.	field penny-cress	seed(s)
<i>Brassica rapa</i> L.	turnip	seed(s)
<i>Raphanus raphanistrum</i> L.	wild radish	pod segments and/or fragment(s) and seeds
<i>Filipendula ulmaria</i> (L.) Maxim.	meadowsweet	achene(s)
<i>Rubus idaeus</i> L.	raspberry	seed(s)
<i>R. fruticosus</i> agg.	blackberry/bramble	seed(s)
<i>Rubus</i> sp(p).	blackberries, etc.	seed(s)
cf. <i>Rosa</i> sp(p).	?roses	prickle(s)
* <i>Potentilla palustris</i> L.	marsh cinquefoil	achene(s)
<i>P.</i> cf. <i>erecta</i> (L.) Rauschel	?tormentil	achene(s)
<i>Potentilla</i> sp(p).	cinquefoils, etc.	achene(s)
<i>Aphanes microcarpa</i> (Boiss. & Reuter) Rothm.	slender parsley-piert	achene(s)
<i>Crataegus monogyna</i> Jacq.	hawthorn	pyrene(s)
<i>Crataegus</i> sp./ <i>Prunus spinosa</i>	hawthorn/sloe	thorn(s)
<i>Prunus spinosa</i> L.	sloe	fruitstone fragment(s)
Leguminosae	pea family	calyx/calyces
<i>Linum catharticum</i> L.	purging flax	seed(s)
<i>Malva sylvestris</i> L.	common mallow	nutlet(s)
<i>Hypericum</i> sp(p).	St John's-worts	seed(s)
<i>Viola</i> sp(p).	violets/pansies, etc	capsule segment(s) and seed(s)
<i>Hydrocotyle vulgaris</i> L.	marsh pennywort	mericarp(s)
<i>Chaerophyllum temulentum</i> L.	rough chervil	mericarp(s)
<i>Anthriscus caucalis</i> Bieb.	bur chervil	mericarp(s)
<i>Aethusa cynapium</i> L.	fool's parsley	mericarp(s)
<i>Conium maculatum</i> L.	hemlock	mericarp(s), including fragments
<i>Pastinaca sativa</i> / <i>Heracleum sphondylium</i>	wild parsnip/hogweed	mericarp(s)
<i>Torilis japonica</i> (Houtt.) DC.	upright hedge-parsley	mericarp(s)
<i>Daucus carota</i> L.	wild carrot	mericarp(s)
<i>Calluna vulgaris</i> (L.) Hull	heather, ling	flower(s)
<i>Anagallis arvensis</i> L.	scarlet pimpernel	seed(s)
<i>Menyanthes trifoliata</i> L.	bogbean	seed(s)
cf. <i>Callitriche</i> sp(p).	?water-starworts	fruit(s)
<i>Marrubium vulgare</i> L.	white horehound	nutlet(s)

<i>Galeopsis</i> Subgenus <i>Galeopsis</i>	hemp-nettles	nutlet(s)
<i>Lamium</i> Section <i>Lamiopsis</i>	annual dead-nettles	nutlet(s)
<i>Stachys</i> sp(p).	woundworts	nutlet(s)
<i>Nepeta cataria</i> L.	cat-mint	nutlet(s)
<i>Prunella vulgaris</i> L.	selfheal	nutlet(s)
<i>Hyoscyamus niger</i> L.	henbane	seed(s)
<i>Solanum nigrum</i> L.	black nightshade	seed(s)
<i>S. dulcamara</i> L.	woody nightshade	seed(s)
<i>Scrophularia</i> sp(p).	figworts	seed(s)
<i>Euphrasia</i> sp./ <i>Odontites verna</i>	eyebright/red bartsia	seed(s)
<i>Pedicularis palustris</i> L.	marsh lousewort	seed(s)
<i>Rhinanthus</i> sp(p).	yellow rattles	seed(s)
<i>Plantago major</i> L.	greater plantain	seed(s)
<i>Sambucus nigra</i> L.	elder	seed(s)
<i>Campanula</i> cf. <i>rotundifolia</i> L.	?harebell, bluebell	seed(s)
<i>Eupatorium cannabinum</i> L.	hemp agrimony	achene(s)
<i>Anthemis cotula</i> L.	stinking mayweed	achene(s)
<i>Arctium</i> sp(p).	burdocks	achene(s)
<i>Carduus/Cirsium</i> sp(p).	thistles	achene(s)
<i>Centaurea</i> cf. <i>nigra</i> L.	?lesser knapweed	involucral bract(s)
<i>Sonchus asper</i> (L.) Hill	prickly sow-thistle	achene(s)
<i>S. oleraceus</i> L.	sow-thistle	achene(s)
<i>Lapsana communis</i> L.	nipplewort	achene(s)
<i>Potamogeton</i> sp(p).	pondweeds	pyrene(s)
<i>Zannichellia palustris</i> L.	fruit(s)	
<i>Juncus bufonius</i> L.	toad rush	seed(s)
<i>Luzula</i> sp(p).	woodrushes	seed(s)
Gramineae	grasses	waterlogged caryopsis/es
Cerealia indet.	cereals	charred caryopsis/es
<i>Danthonia decumbens</i> (L.) DC. in Lam. & DC.	heath grass	caryopsis/es
<i>Lemna</i> sp(p).	duckweeds	seed(s)
<i>Scirpus setaceus</i> L.	bristle club-rush	nutlet(s)
<i>Eleocharis palustris</i> sl	common spike-rush	nutlet(s)
<i>Carex</i> sp(p).	sedges	nutlet(s)

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<b>Invertebrata</b>	Pentatomidae sp.	oap
<b>Annelida</b>	Pentatomidae sp. (nymph)	
Oligochaeta sp. (egg capsule)	<i>Heterogaster urticae</i> (Fabricius)	oap
	<i>Pachybrachius ?fracticollis</i> (Schilling)	oap
<b>Arthropoda</b>	<i>Stygnocoris pedestris</i> (Fallen)	oap
<b>Crustacea</b>	? <i>Stygnocoris</i> sp. indet.	oa
<i>Daphnia</i> sp. (ephippium)	<i>Drymus ?brunneus</i> (Sahlberg)	oap
Cladocera sp. (ephippium)	<i>Drymus</i> sp. indet.	oap
Ostracoda sp.	<i>Scolopostethus</i> sp.	oap
	Lygaeidae sp. indet.	oap
<b>Insecta</b>	<i>Anthocoris</i> sp.	oap
<i>Forficula</i> sp.	?Cimicidae sp. (nymph)	
Dermaptera sp.	<i>Globiceps</i> sp.	oap
	Miridae spp.	oap
<b>Hemiptera</b>	Saldidae sp.	oad
<i>Sehirus bicolor</i> (L.) +	Corixidae sp.	oaw
<i>Pentatoma rufipes</i> (Linnaeus)	Heteroptera sp.	u



Heteroptera sp. (nymph)		<i>Agonum dorsale</i> (Pontoppidan)	oa
<i>Philaenus</i> or <i>Neophilaenus</i> sp.	oap	<i>Amara</i> sp.	oa
<i>Macropsis</i> sp.	oap	<i>Harpalus</i> sp.	oa
<i>Agallia</i> sp.	oap	<i>Dromius ?melanocephalus</i> Dejean	oa
<i>Aphrodes ?bifasciatus</i> (Linnaeus)	oapd	<i>Metabletus</i> sp.	oa
<i>Aphrodes flavostriatus</i> (Donovan)	oapd	Carabidae spp. indet.	ob
<i>Aphrodes</i> sp.	oap	<i>Hygrotus</i> sp.	oaw
Auchenorrhyncha spp.	oap	<i>?Hydroporus dorsalis</i> (Fabricius)	oaw
Auchenorrhyncha sp. (nymph)		<i>Potamonectes depressus elegans</i> (Panzer)	oaw
<i>Psylla</i> sp.	oap	Hydroporinae spp.	oaw
Aphidoidea sp.		<i>Agabus bipustulatus</i> or <i>striolatus</i> (Linnaeus)	oaw
		<i>Agabus</i> or <i>Ilybius</i> spp.	oaw
		<i>?Rhantus</i> sp.	oaw
<b>Diptera</b>		<i>Colymbetes fuscus</i> (Linnaeus)	oaw
Bibionidae sp.		Colymbetinae sp. indet.	oaw
Chironomidae sp. (larva)		<i>Helophorus aquaticus</i> (Linnaeus)	oaw
<i>Nematocera</i> sp.		<i>Helophorus nubilus</i> Fabricius	oa
Diptera sp. (adult)		<i>Helophorus</i> spp.	oaw
Diptera sp. (larva)		<i>Sphaeridium ?bipustulatum</i> Fabricius	rf
Diptera sp. (pupa)		<i>Cercyon analis</i> (Paykull)	rt
Diptera sp. (puparium)		<i>Cercyon haemorrhoidalis</i> (Fabricius)	rf
		<i>Cercyon terminatus</i> (Marshall)	rf
		<i>Cercyon ?tristis</i> (Illiger)	oad
		<i>Cercyon ustulatus</i> (Preyssler)	oad
		<i>Cercyon</i> spp. indet.	u
<b>Hymenoptera</b>		<i>Megasternum obscurum</i> (Marshall)	rt
Formicidae sp		<i>Hydrobius fuscipes</i> (Linnaeus)	oaw
Hymenoptera Aculeata spp.		<i>Laccobius</i> sp.	oaw
Hymenoptera sp.		<i>Enochrus</i> sp.	oaw
		Hydrophilinae spp. indet.	oaw
<b>Trichoptera</b>		<i>Onthophilus striatus</i> (Forster)	rt
Trichoptera sp.		Histerinae sp.	u
		<i>Ochthebius minimus</i> (Fabricius)	oaw
		<i>Ochthebius</i> sp. indet.	oaw
		<i>Hydraena britteni</i> or <i>rufipes</i>	oaw
		<i>Hydraena testacea</i> Curtis	oaw
		<i>Limnebius</i> sp.	oaw
		<i>Ptenidium</i> sp.	rt
		<i>Acrotrechis</i> sp.	rt
		Leiodinae sp.	u
		<i>?Ptomaphagus</i> sp.	u
		<i>Nargus velox</i> (Spence)	u
		<i>Catops</i> sp.	u
		<i>Colon</i> sp.	u
		<i>Silpha atrata</i> Linnaeus	u
		<i>Silpha</i> sp.	u
		Silphidae sp. indet.	u
		<i>Micropeplus porcatus</i> (Paykull)	rt
		<i>Micropeplus staphylinoides</i> (Marshall)	rt
		<i>Micropeplus</i> sp. indet.	rt
		<i>Megarthritis</i> sp.	rt
		<i>Anthobium ?atrocephalum</i> (Gyllenhal)	oa
		<i>Anthobium</i> sp. indet.	oa
		<i>Olophrum</i> sp.	oa
<b>Coleoptera</b>			
<i>Elaphrus cupreus</i> Duftschmid	oad		
<i>Loricera pilicornis</i> (Fabricius)	oa		
<i>Dyschirius ?globosus</i> (Herbst)	oa		
<i>Clivina ?fossor</i> (Linnaeus)	oa		
<i>Trechus obtusus</i> or <i>quadristriatus</i>	oa†		
<i>Bembidion lampros</i> or <i>properans</i>	oa		
<i>Bembidion ?gilvipes</i> Sturm	oad		
<i>Bembidion obtusum</i> Serville	oa		
<i>Bembidion ?biguttatum</i> (Fabricius)	oad		
<i>Bembidion</i> sp. indet.	oa		
<i>Pterostichus cupreus</i> (Linnaeus)	oa		
<i>Pterostichus (Poecilus)</i> sp. indet.	oa		
<i>Pterostichus melanarius</i> (Illiger)	ob		
<i>Pterostichus nigrata</i> (Paykull)	oad		
<i>Pterostichus oblongopunctatus</i> (Fabricius)	oa		
<i>Pterostichus vernalis</i> (Panzer)	oa		
<i>Pterostichus</i> sp. indet.	ob		
<i>Calathus ?ambiguus</i> (Paykull)	oa		
<i>Calathus fuscipes</i> (Goeze)	oa		
<i>Calathus melanocephalus</i> (Linnaeus)	oa		
<i>Calathus</i> sp. indet.	oa		

<i>Acidota cruentata</i> Mannerheim	oa	<i>Oxyomus sylvestris</i> (Scopoli)	rt
<i>Lesteva heeri</i> Fauvel	oad	<i>Phyllopertha horticola</i> (Linnaeus)	oap
<i>Lesteva longoelytrata</i> (Goeze)	oad	<i>Cyphon</i> sp.	oad
<i>Lesteva</i> sp. indet.	oad	Byrrhidae sp.	oap
<i>Omaliium caesum</i> or <i>italicum</i>	rt	<i>Dryops</i> sp.	oad
<i>Omaliium ?rivulare</i> (Paykull)	rt	<i>Agrypnus murinus</i> (Linnaeus)	oap
<i>Omaliium</i> sp. indet.	rt	<i>Agrypnus murinus</i> (larva)	
<i>Omaliinae</i> sp.	u	<i>Athous haemorrhoidalis</i> (larva)	
<i>Carpelimus bilineatus</i> Stephens	rt	<i>Athous hirtus</i> (Herbst)	oap
<i>Carpelimus rivularis</i> (Motschulsky)	obd	<i>Athous</i> sp. indet.	oap
<i>Carpelimus</i> sp.	u	<i>Selatosomus ?incanus</i> (Gyllenhal)	oa
<i>Aploderus caelatus</i> (Gravenhorst)	rt	<i>Agriotes obscurus</i> (Linnaeus)	oap
<i>Platystethus arenarius</i> (Fourcroy)	rf	? <i>Agriotes</i> sp. indet.	oap
<i>Platystethus degener</i> Mulsant & Rey	oad	Elateridae spp. indet.	ob
<i>Platystethus cornutus</i> group	oad	Elateridae sp. indet. (larva)	
<i>Platystethus nitens</i> (Sahlberg)	oad	<i>Melasis buprestoides</i> (Linnaeus)	l
<i>Platystethus nodifrons</i> (Mannerheim)	oad	<i>Cantharis</i> sp.	ob
<i>Anotylus nitidulus</i> (Gravenhorst)	rtd†	<i>Rhagonycha ?lignosa</i> (Muller)	ob
<i>Anotylus rugosus</i> (Fabricius)	rt	Cantharidae sp.	ob
<i>Anotylus sculpturatus</i> group	rt	? <i>Anobium</i> sp.	l
<i>Oxytelus sculptus</i> Gravenhorst	rt	<i>Brachypterus</i> sp.	oap
<i>Stenus</i> spp.	u	<i>Meligethes</i> spp.	oap
<i>Lathrobium</i> sp.	u	Nitidulidae sp.	u
<i>Rugilus rufipes</i> Germar	rt	<i>Atomaria</i> spp.	rd
? <i>Rugilus</i> sp. indet.	rt	<i>Ephistemus globulus</i> (Paykull)	rd
<i>Othius punctulatus</i> (Goeze)	rt	Phalacridae sp.	oap
<i>Gyrophypnus ?angustatus</i> Stephens	rt	? <i>Sericoderus lateralis</i> (Gyllenhal)	rt
<i>Gyrophypnus</i> sp. indet.	rt	<i>Orthoperus</i> sp.	rt
<i>Xantholinus gallicus</i> or <i>linearis</i>	rt	Coccinellidae sp.	oap
<i>Xantholinus ?linearis</i> (Olivier)	rt	<i>Lathridius minutus</i> group	rd
<i>Xantholinus linearis</i> group indet.	rt	<i>Enicmus histriol/transversus</i> .	rt
<i>Philonthus</i> spp.	u	? <i>Corticaria</i> sp.	rt
<i>Quedius</i> sp.	u	<i>Corticarina</i> sp.	rt
Staphylininae sp. indet.	u	Corticariinae sp. indet.	rt
<i>Mycetoporus</i> sp.	u	<i>Lagria</i> sp.	oap
<i>Tachyporus solutus</i> Erichson	u	? <i>Chrysolina</i> sp.	oap
<i>Tachyporus</i> sp.	u	<i>Gastrophysa viridula</i> (Degeer)	oap
<i>Tachinus ?signatus</i> Gravenhorst	u	<i>Phaedon</i> sp.	oap
<i>Tachinus</i> sp.	u	<i>Prasocuris phellandrii</i> (Linnaeus)	oapd
<i>Cordalia obscura</i> (Gravenhorst)	rt	<i>Chrysolina</i> or <i>Chrysomela</i> sp.	oap
<i>Falagria thoracica</i> Stephens	rt	Chrysomelinae sp. indet.	oap
<i>Falagria</i> or <i>Cordalia</i> sp. indet.	rt	<i>Phyllotreta</i> spp.	oap
? <i>Dinaraea</i> sp.	u	<i>Aphthona</i> sp.	oap
<i>Drusilla canaliculata</i> (Fabricius)	u	<i>Longitarsus</i> sp.	oap
<i>Oxypoda</i> sp.	u	<i>Chaetocnema concinna</i> (Marsham)	oap
Aleocharinae spp.	u	? <i>Chaetocnema</i> sp. indet.	oap
Staphylinidae sp.	u	Halticinae sp. indet.	oap
<i>Tychus ?niger</i> (Paykull)	u	Chrysomelidae sp.	oap
?Pselaphidae sp.	u	<i>Apion</i> ( <i>Ceratapion</i> ) <i>onopordi</i> Kirby	oap
<i>Geotrupes</i> sp.	oarf	<i>Apion</i> ( <i>Ceratapion</i> ) sp. indet.	oap
<i>Colobopterus haemorrhoidalis</i> (Linnaeus)	oarf	<i>Apion</i> ( <i>Eutrichapion</i> ) <i>minimum</i> Herbst	oap
<i>Aphodius contaminatus</i> (Herbst)	oarf	<i>Apion</i> ( <i>Protapion</i> ) sp.	oap
<i>Aphodius villosus</i> Gyllenhal	oap	<i>Apion</i> spp.	oap
<i>Aphodius</i> spp.	obrf	<i>Phyllobius</i> or <i>Polydrusus</i> sp.	oap

<i>Sitona humeralis</i> Stephens	oap
<i>Sitona lineatus</i> (Linnaeus)	oap
<i>Sitona</i> spp. indet.	oap
<i>Tanysphyrus lemnae</i> (Paykull)	oawp
<i>Sitophilus granarius</i> (Linnaeus)	g
<i>Notaris acridulus</i> (Linnaeus)	oadp
<i>Notaris</i> sp. indet.	oadp
<i>Cidnorhinus quadrimaculatus</i> (Linnaeus)	oap
<i>Ceutorhynchus erysimi</i> (Fabricius)	oap
<i>Ceutorhynchus floralis</i> (Paykull)	oap
<i>Ceutorhynchus parvulus</i> Brisout	oap
<i>Ceutorhynchus ?pollinarius</i> (Forster)	oap
<i>Ceutorhynchus</i> sp. indet.	oap
Ceuthorhynchinae sp.	oap
Curculionidae spp.	oa†
Coleoptera spp.	u
Coleoptera spp. (larva)	

Insecta sp. pupa

**Arachnida**

Acarina sp.

Aranae sp.

Opiliones sp.

Pseudoscorpiones sp.

Table 2. List of taxa and numbers of records of plants possibly or probably used for food (group FOOS), as a medicinal herbs (group HERB), or for litter (group USEF), by phase for samples of Romano-British date from excavations on the Leven-Brandesburton by-pass.

FOOS: *Cerealia* indet., *Crataegus monogyna*, *Daucus carota*, *Prunus spinosa*, *Rubus fruticosus* agg., *R. idaeus*, *Sambucus nigra*, *Corylus avellana*

HERB: *Marrubium vulgare*, *Nepeta cataria*

USEF: *Pteridium aquilinum* (stalk fgts)

Period	Phase	FOOS	HERB	USEF
Prehistoric	1	1	-	-
Romano-British	2/3/4	3	1	-
	3	7	6	1
	3/4	2	1	-
	4	-	2	-
	6	2	-	-
	7	6	2	-
	?	2	-	-

*Table 3. Taxa scored in the vegetation group ARTE (Artemisietea—communities of biennial and perennial herbs typically found on roadsides, in hedgerows and on neglected waste ground with a high nutrient status) from samples of Romano-British date from the excavations on the Leven-Brandesburton by-pass and some other sites of similar date. G—from late Romano-British (C4th) deposits at Glebe Farm, near Brigg, S. Humberside; N—from Romano-British (C2nd-C4th) samples at North Cave, N. Humberside. Of these taxa, only Eupatorium cannabinum was missing from the list from N. Cave; taxa marked (G) were identified only tentatively at Glebe Farm. Taxa from the latter site scored in ARTE but absent at Leven were Melissa officinalis, Pastinaca sativa and Stellaria cf. neglecta*

<i>Urtica dioica</i> NG	<i>Conium maculatum</i> N
<i>Moehringia trinervia</i> N	<i>Torilis japonica</i> N
<i>Silene vulgaris</i> N	<i>Daucus carota</i> N(G)
<i>S. alba</i> N	<i>Marrubium vulgare</i> N
<i>Ranunculus</i> Section <i>Ranunculus</i> NG	<i>Galeopsis</i> Subgenus <i>Galeopsis</i> NG
<i>Descurainia sophia</i> N	<i>Nepeta cataria</i> N
<i>Brassica rapa</i> NG	<i>Hyoscyamus niger</i> NG
<i>Filipendula ulmaria</i> N	<i>Solanum dulcamara</i> N(G)
<i>Rubus fruticosus</i> agg. NG	<i>Eupatorium cannabinum</i>
<i>Malva sylvestris</i> NG	<i>Arctium</i> sp(p). N
<i>Chaerophyllum temulentum</i> N	<i>Sonchus oleraceus</i> N
<i>Anthriscus caucalis</i> N	<i>Lapsana communis</i> N

*Table 4. Statistics concerning the vegetation group ARTE (explained in caption to Table 3) for samples of Romano-British date from excavations on the Leven Brandesburton by-pass and from some other sites of similar date in the area.*

Site/period	Mean (Min, Max) % ARTE taxa	Mean (Min, Max) AIV	No. samples
Leven-Brandesburton by-pass			
2 (EC2)	0	0	1
2/3/4	26.5	30.0	1
3 (?C3)	29.1 (22.4, 35.3)	28.4 (19, 42)	5
3/4	26.8	29.0	1
4 (LC4)	25.0 (0, 57.1)	10.3 (0, 20)	3
6 (LC4)	15.6 (0, 100.0)	0.5 (0, 2)	8
7 (LC4)	25.9 (0, 66.7)	4.6 (0, 22)	13
All R/B	23.0 (0, 100.0)	9.3 (0, 42)	32
North Cave			
2 (EC2)	17.0 (0, 33.0)	3.7 (0, 7)	3
3 (LC2-EC3)	18.0 (0, 50.0)	12.1 (0, 29)	27
4 (LC3-LC4)	8.8 (0, 26.0)	8.4 (0, 26)	12
All R/B	15.3 (0, 50.0)	10.5 (0, 29)	42
Glebe Farm			
Mid/Late C4	21.0 (20.0, 22.0)	17.5 (10, 25)	2

Table 5. Main statistics for the assemblages of adult beetles and bugs from scan- and rapid-scan recorded subsamples from excavations on the Leven-Brandesburton by-pass. Parallel data for the sites at North Cave and Glebe Farm are added for comparison. For P%NOB etc: P%Nx - 'period percentage', i.e. percentage based all individuals from that phase and parameter. For explanation of abbreviations see Appendix Table A4. For 'number of assemblages', the number in parentheses indicates the number of assemblages with 20 or more individuals. For the  $\alpha$  values, the number in parentheses indicates the number of assemblages where the value of  $\alpha$  exceeded its standard error, or half its standard error; other values have been excluded from calculation of means, and  $\alpha$  values have not in any case been calculated for assemblages of less than 20 individuals. Note the small number of cases available for some calculations. \* — first number is mean for all assemblages, number in parentheses is mean for assemblages where  $N > 0$ ; †—see text for comment on the single record from this category.

	Leven-Brandesburton by-pass	North Cave	Glebe Farm
Number of assemblages (no. with N>0)	38 (8)	28 (14)	1
S	14.9 (40.5)*	35.2 (47.0)*	233
N	19.4 (57.7)*	50.0 (66.7)*	796
Where SE alpha less than alpha:			
$\alpha$	213.0 (7)	146.0 (14)	111.0 (1)
$\alpha$ OB	118.0 (7)	111.0 (10)	60.0 (1)
$\alpha$ RT	31.0 (4)	29.3 (6)	26.0 (1)
Where SE alpha less than alpha/2:			
$\alpha$	156 (6)	137.0 (9)	111.0 (1)
$\alpha$ OB	87 (4)	98.1 (6)	60.0 (1)

	<b>Leven-Brandesburton by-pass</b>	<b>North Cave</b>	<b>Glebe Farm</b>
α RT	27 (3)	23.6 (5)	26.0 (1)
Total no. individuals	739	1402	796
Phase percentages			
P%NOB	57.9	60.3	53.9
P%NW	12.9	7.4	26.3
P%ND	10.7	9.5	10.3
P%NP	23.4	32.3	17.1
P%NM	0.0	0.0	0.0
P%NL	0.3	0.9	1.1
P%NG	0.1†	0.0	0.0
P%NRT	27.5	23.5	33.4
P%NRD	2.0	3.3	6.7
P%NRF	6.5	4.4	4.0



*Table 6. Vertebrate remains: species identifications and numbers of fragments per recorded context (IA = Iron Age, remaining contexts being Romano-British).*

<b>Context</b>	<b>Cattle</b>	<b>Caprovid</b>	<b>Pig</b>	<b>Horse</b>	<b>Unidentified</b>
47	3				12
55	1				14
179 (IA)	4				12
218	3				
231	10	1	1		
258		1			9
282	1				
286	2				4
290	4				4
331	1				17
336	26	1	1		
337	7				
345	1			1	13
358					10
370	1				
378	4				16
441	4				2
458	4				25
468	5			10	21
472	1			1	6
480	1				8
537	-				19
543	2				
633	1				
<b>Total (24)</b>	<b>86</b>	<b>3</b>	<b>2</b>	<b>12</b>	<b>192</b>

## Appendix

### Plant data

Table A1. Lists of plant taxa and other components recorded from samples from excavations on the Leven-Brandesburton by-pass in context/sample order. For each subsample, 'other components' are listed first, then identified plant remains in taxonomic order.

<b>Context: 11</b>	Stellaria media	1		
<b>Sample: 12/T</b>	Conium maculatum	2	<b>Context: 97</b>	
Pre-Quaternary megaspores	Carduus/Cirsium sp(p).	1	<b>Sample: 112/T</b>	
coal			flint gravel	2
flint gravel	<b>Context: 47</b>		herbaceous detritus	1
root/rootlet fgts	<b>Sample: 108/X</b>		sand	2
sand	Pre-Quaternary megaspores	1		
	charcoal	1	Urtica dioica	1
	coal	1	Chenopodium Sect. Pseudoblitum	1
<b>Sample: 15/T</b>	flint gravel	4	Rubus cf. fruticosus agg.	1
'char'	iron-rich concretions	1	Conium maculatum	1
?coal	root/rootlet fgts	1	Hyoscyamus niger	1
charcoal	sand	2	Juncus bufonius	1
flint gravel			Gramineae	1
root/rootlet fgts	Urtica dioica	1		
sand	Spergula arvensis	1	<b>Context: 202</b>	
	Conium maculatum	1	<b>Sample: 270/T</b>	
Bilderdykia convolvulus (ff)			?bryozoa	2
Montia fontana ssp. chondrosperma			Daphnia (ephippia)	1
	<b>Context: 68</b>		Pre-Quaternary megaspores	1
	<b>Sample: 88/T</b>		charcoal	1
<b>Context: 13</b>	Pre-Quaternary megaspores	1	earthworm egg caps	1
<b>Sample: 14/T</b>	coal	2	flint gravel	2
charcoal	flint gravel	2	sand	4
charred herbaceous detritus	root/rootlet fgts	1		
flint gravel	sand	3	Urtica dioica	3
pottery			Polygonum aviculare agg.	1
root/rootlet fgts			Rumex sp(p).	3
sand	<b>Context: 74</b>		Chenopodium Sect. Pseudoblitum	1
	<b>Sample: 78/T</b>		Stellaria media	1
cf. Corylus avellana (ch)	charcoal	2	Ranunculus Sect. Ranunculus	1
Montia fontana ssp. chondrosperma	flint gravel	1	Ranunculus sceleratus	1
cf. Danthonia decumbens	root/rootlet fgts	1	Potentilla sp(p).	1
			Viola sp(p).	1
<b>Context: 43</b>	<b>Context: 90</b>		Viola sp(p). (caps segs)	1
<b>Sample: 107/T</b>	<b>Sample: 143/TA</b>		Anthriscus caucalis	2
charcoal	Pre-Quaternary megaspores	1	Conium maculatum	2
flint gravel	charred ?herbaceous detritus	1	Marrubium vulgare	1
iron-rich concretions	flint gravel	1	Lamium Sect. Lamiopsis	1
root/rootlet fgts	herbaceous detritus	1	Stachys sp(p).	1
wood fgts	sand	3	Nepeta cataria	1
			Hyoscyamus niger	1
Urtica dioica			Plantago major	1



Polygonum persicaria	1			Urtica dioica	3
Polygonum lapathifolium	1			Urtica urens	2
Rumex acetosella agg.	1	<b>Sample: 383/T</b>		Polygonum aviculare agg.	2
Chenopodium album	1	charcoal	1	Polygonum persicaria	1
Atriplex sp(p).	1	coal	1	Polygonum lapathifolium	1
Montia fontana ssp. chondrosperma	1	flint gravel	2	Rumex sp(p).	1
Moehringia trinervia	1	root/rootlet fgts	1	Rumex acetosella agg.	2
Stellaria media	1	sand	3	Chenopodium album	1
Stellaria graminea	1			Atriplex sp(p).	1
Ranunculus Sect. Ranunculus	1	Chenopodium album	1	Stellaria media	2
Ranunculus Subgenus Batrachium	1	Atriplex sp(p).	1	Silene vulgaris	1
Papaver argemone	1	Spergula arvensis	1	Silene alba	1
Brassica rapa	1	Sambucus nigra	1	Ranunculus Sect. Ranunculus	1
Rubus idaeus	1			Ranunculus flammula	1
Rubus fruticosus agg.	1			Papaver argemone	1
Potentilla cf. erecta	1	<b>Sample: 673/T</b>		Descurainia sophia	1
Hypericum sp(p).	1	charcoal	1	Thlaspi arvense	1
Conium maculatum	1	coal	1	Brassica cf. rapa	1
Marrubium vulgare	1	flint gravel	2	Raphanus raphanistrum (pod segs/fgts)	
Galeopsis Subgenus Galeopsis	1	sand	4		2
Stachys sp(p).	1			Raphanus raphanistrum (s)	1
Solanum nigrum	1	Polygonum aviculare agg.	1	Rubus fruticosus agg.	1
Solanum dulcamara	1	Spergula arvensis	1	cf. Rosa sp(p). (prickles)	1
Carduus/Cirsium sp(p).	1			Potentilla cf. erecta	1
Centaurea cf. nigra (inv br)	1			Prunus spinosa (fgts)	1
Sonchus asper	2	<b>Context: 345</b>		Linum catharticum	1
Juncus bufonius	1	<b>Sample: 638/T</b>		Hydrocotyle vulgaris	1
Gramineae	1	Pre-Quaternary megaspores	1	Chaerophyllum temulentum	1
Eurhynchium sp(p).	1	charcoal	1	Anthriscus caucalis	1
		flint gravel	2	Aethusa cynapium	1
		iron-rich concretions	1	Conium maculatum	1
		sand	3	Daucus carota	1
<b>Context: 336</b>				Anagallis arvensis	1
<b>Sample: 430/T</b>				Menyanthes trifoliata	1
Pre-Quaternary megaspores	1	Urtica dioica	1	Marrubium vulgare	1
charcoal	1	Rumex sp(p). (ch)	1	Prunella vulgaris	1
flint gravel	1	Ranunculus sceleratus	1	Hyoscyamus niger	2
iron-rich concretions	2	Rubus idaeus	1	Solanum nigrum	1
sand	3	Conium maculatum	2	Euphrasia sp./Odontites verna	2
		Marrubium vulgare	1	Sambucus nigra	3
Urtica dioica	1	Hyoscyamus niger	1	Carduus/Cirsium sp(p).	1
Rubus sp(p).	1	Eleocharis palustris sl	1	Sonchus asper	1
Conium maculatum (mf)	1			Eleocharis palustris sl	1
		<b>Context: 351</b>		Carex sp(p).	1
		<b>Sample: 352/T</b>		Thuidium tamariscinum	1
		Pre-Quaternary megaspores	1	Drepanocladus sp(p).	1
		beetles	1	cf. Hypnum cupressiforme	1
		charcoal	1		
		coal	1	<b>Context: 370</b>	
		flint gravel	1	<b>Sample: 391/T</b>	
Urtica dioica	1	root bark/epidermis fgts	1	?umbel fgts	1
Spergula arvensis	2	sand	3	Daphnia (ephippia)	1
Ranunculus sceleratus	1			Pre-Quaternary megaspores	1
Carex sp(p).	1	Filicales (pinn fgts)	1		

earthworm egg caps	1	root/rootlet fgts	1		
flint gravel	2	sand	3		
fly puparia	1			<b>Context: 436</b>	
sand	3	Polygonum aviculare agg.	1	<b>Sample: 782/T</b>	
wood fgts	1	Chenopodium album	1	charcoal	2
		Scirpus setaceus	1	flint gravel	1
Urtica dioica	3			root/rootlet fgts	1
Urtica urens	2			sand	2
Polygonum aviculare agg.	1	<b>Context: 405</b>			
Polygonum persicaria	1	<b>Sample: 498/T</b>			
Polygonum lapathifolium	1	?bryozoa	1	<b>Context: 455</b>	
Rumex sp(p).	1	Daphnia (ephippia)	3	<b>Sample: 491/T</b>	
Rumex acetosella agg.	1	beetles	2	charcoal	1
Chenopodium Sect. Pseudoblitum	1	earthworm egg caps	1	flint gravel	1
Chenopodium album	1	flint gravel	1	root/rootlet fgts	2
Atriplex sp(p).	1	mites	1	sand	2
Montia fontana ssp. chondrosperma	1	sand	2		
Stellaria media	1	wood fgts	2	Stellaria media	1
Spergula arvensis	1				
Ranunculus Sect. Ranunculus	1	Alnus glutinosa	1		
Papaver argemone	1	Urtica dioica	4	<b>Context: 458</b>	
Brassica rapa	1	Polygonum aviculare agg.	1	<b>Sample: 459/T</b>	
Raphanus raphanistrum (pod segs/fgts)	1	Polygonum persicaria	2	charcoal	1
	1	Rumex sp(p).	2	coal	1
Raphanus raphanistrum (s)	1	Atriplex sp(p).	1	flint gravel	1
Rubus fruticosus agg.	1	Montia fontana ssp. chondrosperma	1	iron-rich concretions	1
Chaerophyllum temulentum	1	Stellaria media	2	root/rootlet fgts	1
Anthriscus caucalis	2	Ranunculus Sect. Ranunculus	1	sand	4
Conium maculatum	1	Ranunculus Subgenus Batrachium	2		
Menyanthes trifoliata	1	Rubus idaeus	1	Polygonum aviculare agg.	1
Marrubium vulgare	1	Aphanes microcarpa	1	Spergula arvensis	1
Stachys sp(p).	1	Crataegus monogyna	1	<b>Context: 493</b>	
Prunella vulgaris	1	Malva sylvestris	1	<b>Sample: 497/T</b>	
Hyoscyamus niger	1	Chaerophyllum temulentum	2	Pre-Quaternary megaspores	1
Solanum nigrum 1		Aethusa cynapium	1	flint gravel	2
Solanum dulcamara	1	Conium maculatum (mf)	1	root/rootlet fgts	1
Scrophularia sp(p).	1	Pastinaca sativa/Heracleum		sand	4
Pedicularis palustris	1	sphondylium	1		
Sambucus nigra	2	Torilis japonica	2	Polygonum aviculare agg.	1
Arctium sp(p).	1	cf. Callitriche sp(p).	1	Spergula arvensis	1
Carduus/Cirsium sp(p).	1	Marrubium vulgare	1		
Sonchus asper	1	Lamium Sect. Lamiopsis	1		
Gramineae	1	Stachys sp(p).	1	<b>Context: 541</b>	
Scirpus setaceus	1	Solanum nigrum	1	<b>Sample: 546/T</b>	
Carex sp(p).	1	Solanum dulcamara	1	charcoal	1
Sphagnum sp(p). (lvs)	1	Scrophularia sp(p).	3	charred herbaceous detritus	1
Drepanocladus sp(p).	1	Plantago major	1	flint gravel	3
Hylocomium splendens	1	Sambucus nigra	2	root/rootlet fgts	1
		Arctium sp(p).	1	sand	4
		Carduus/Cirsium sp(p).	2		
<b>Context: 401</b>		Sonchus asper	1	Filicales (ch pinn fgts)	1
<b>Sample: 727/T</b>		Zannichellia palustris	1	Spergula arvensis	1
flint gravel	1	Gramineae	1		
iron-rich concretions	1	Cratoneuron filicinum	1		

<b>Context: 544</b>		<b>Context: 696</b>		Filipendula ulmaria	1
<b>Sample: 566/T</b>		<b>Sample: 697/TA</b>		Rubus sp(p).	1
?root bark/epidermis fgts	1	?root bark/epidermis fgts	1	Potentilla cf. erecta	2
bone fgts	1	charcoal	1	Crataegus sp./Prunus spinosa (thorns)	1
charcoal	1	flint gravel	1	Leguminosae (cal)	1
flint gravel	3	sand	3	Linum catharticum	1
root/rootlet fgts	1			Malva sylvestris	1
sand	4	Cerealia indet.	1	Viola sp(p). (caps segs)	1
				Anthriscus caucalis	2
Urtica dioica	1			Conium maculatum	2
		<b>Context: 712</b>		Calluna vulgaris (fls)	1
		<b>Sample: 726/T</b>		Marrubium vulgare	1
<b>Context: 567</b>		charcoal	1	Galeopsis Subgenus Galeopsis	1
<b>Sample: 569/T</b>		flint gravel	1	Stachys sp(p).	2
Pre-Quaternary megaspores	1	root/rootlet fgts	1	Nepeta cataria	1
charcoal	1	sand	3	Prunella vulgaris	1
charred ?herbaceous detritus	1			Hyoscyamus niger	3
coal	1	Spergula arvensis	1	Solanum nigrum	1
root/rootlet fgts	1			Pedicularis palustris	1
				Rhinanthus sp(p).	1
Chenopodium album	1	<b>Context: 716</b>		Sambucus nigra	1
Montia fontana ssp. chondrosperma (ch)	1	<b>Sample: 725/TA</b>		Eupatorium cannabinum	1
Spergula arvensis	1	Daphnia (ephippia)	3	Anthemis cotula	1
		Pre-Quaternary megaspores	1	Carduus/Cirsium sp(p).	1
		charcoal	1	Sonchus asper	2
		coal	1	Sonchus oleraceus	1
<b>Context: 639</b>		dicot lf fgts	1	Zannichellia palustris	1
<b>Sample: 645/T</b>		earthworm egg caps	1	Juncus bufonius	1
charcoal	1	fly puparia	1	Luzula sp(p).	1
flint gravel	2	sand	2	Gramineae	1
root/rootlet fgts	1	wood fgts	1	Carex sp(p).	1
sand	3			Sphagnum sp(p). (shts)	2
		Filicales (pinn fgts)	1	Aulacomnium palustre	1
Polygonum aviculare agg.	1	Pteridium aquilinum (stalk fgts)	1	Calliargon cuspidatum	1
Rumex acetosella agg.	1	Urtica dioica	4	cf. Hypnum cupressiforme	1
Chenopodiaceae	1	Urtica urens	1	Rhytidadelphus sp(p).	1
Spergula arvensis	2	Polygonum aviculare agg.	2	Hylocomium splendens	2
		Polygonum persicaria	1		
		Polygonum lapathifolium	2	<b>Context: 722</b>	
<b>Context: 680</b>		Rumex sp(p).	1	<b>Sample: 723/T</b>	
<b>Sample: 682/T1</b>		Rumex acetosella agg.	1	?root bark/epidermis fgts	1
root/rootlet fgts	2	Chenopodium Sect. Pseudoblitum	3	charcoal	1
flint gravel	1	Chenopodium album	2	flint gravel	1
sand	2	Atriplex sp(p).	1	iron-rich concretions	2
Populus sp(p). (b/bs)	1	Stellaria sp(p).	1	root/rootlet fgts	1
cf. Quercus sp(p). (b/bs)	1	Stellaria media	3	sand	3
Rubus idaeus	1	Cerastium sp(p).	1		
Viola sp(p).	1	Ranunculus Sect. Ranunculus	2		
Stachys sp(p).	1	Ranunculus sardous	2		
Sambucus nigra	1	Ranunculus sceleratus	3		
Potamogeton sp(p).	2	Papaver argemone	1		
Characeae	4	Cruciferae	1		
		Brassica rapa	1		



Table A2. Abundance-indicator (AIV) values for a series of groups representing plant ecology and uses for the samples from excavations on the Leven-Brandesburton by-pass. The groups are explained in Table A3.

<b>Context: 11</b> No. taxa	<b>Sample 12/T</b> 0	<b>Context: 74</b> No. taxa 0	<b>Sample 78/T</b>	No. taxa	17
<b>Context: 11</b> <b>15/T</b> No. taxa	<b>Sample:</b> 2	<b>Context: 90</b> No. taxa	<b>Sample 143/TA</b> 0	Unclassified UNCL	0
Vegetation ISNA	3	<b>Context: 97</b> <b>112/T</b> No. taxa	<b>Sample:</b> 7	Uses FOOS	3
CHEN	2	Unclassified		Vegetation CHEN	22
MOCA	1	UNCL	0	ARTE	19
<b>Context: 13</b> <b>14/T</b> No. taxa	<b>Sample:</b> 3	Uses FOOS	3	RHPR	10
Uses FOOS	1	Vegetation ARTE	7	QUFA	9
Vegetation ISNA	3	CHEN	4	MOAR	8
MOAR	1	BIDE	3	ALNE	6
<b>Context: 43</b> <b>107/T</b> No. taxa	<b>Sample:</b> 4	ALNE	2	SECA	5
Unclassified UNCL	0	NACA	1	ISNA	3
Vegetation ARTE	6	<b>Context: 202</b> <b>Sample: 270/T</b> No. taxa	22	FEBR	2
MOAR	4	Unclassified UNCL	0	PHRA	1
ALNE	2	Uses HERB	2	<b>Context: 258</b> <b>Sample: 374/T</b> No. taxa	7
<b>Context: 47</b> <b>108/X</b> No. taxa	<b>Sample:</b> 3	Ecology CALC	2	Unclassified UNCL	0
Ecology FUGE	3	Uses HERB	2	Vegetation ARTE	11
Vegetation ARTE	4	Vegetation ARTE	23	CHEN	7
SECA	3	CHEN	20	ALNE	4
ALNE	2	BIDE	8	BIDE	2
<b>Context: 68</b> <b>Sample 88/T</b> No. taxa	<b>Sample 88/T</b> 0	QUFA	7	<b>Context: 258</b> <b>Sample:</b> <b>375/TA</b> No. taxa	28
		ALNE	6	Unclassified UNCL	0
		ISNA	3	Ecology FUGE	3
		FEBR	2	Mosses BOGS	3
		PHRA	1		
		<b>Context: 202</b> <b>Sample: 271/T</b>			



Uses				Ecology			
HERB	2	Vegetation		FUGE			6
		POTA	9				
Vegetation		RHPR	8	Vegetation			
CHEN	46	ARTE	7	SECA	6		
BIDE	21	EPIL	6	CHEN			4
ARTE	20	CHEN	5	BIDE			3
SECA	16	ALNE	4	ALNE			2
EPIL	8	LEMN	3				
ALNE	6	MOAR	2	<b>Context: 337</b>		<b>Sample: 383/T</b>	
MOAR	4			No. taxa			4
ISNA	3	<b>Context: 317</b>					
CAKI	2	No. taxa	31	Ecology			
QUER	1			FUGE			3
		Unclassified					
<b>Context: 290</b>		UNCL	0	Uses			
<b>Sample: 288/TA</b>				FOOS			3
No. taxa	32	Mosses					
		UNCL	0	Vegetation			
Unclassified				CHEN			7
UNCL	0	Uses		SECA			3
		FOOS	6	BIDE			2
Ecology		FOOO	1				
FUGE	3	Vegetation		<b>Context: 337</b>		<b>Sample: 673/T</b>	
		CHEN	30	No. taxa			2
Mosses		ARTE	22				
BOGS	6	EPIL	14	Ecology			
GRAS	2	QUFA	13	FUGE			3
		RHPR	10				
Uses		ALNE	8	Vegetation			
FOOS	3	ISNA	7	SECA			5
HERB	1	CAKI	4	CHEN			4
		PHRA	3	PLAN			3
Vegetation		MOCA	2				
CHEN	36	QUER	1	<b>Context: 345</b>		<b>Sample: 638/T</b>	
ARTE	26			No. taxa			8
BIDE	14	<b>Context: 336</b>					
MOAR	13	No. taxa	3	Unclassified			
RHPR	10			UNCL			0
QUFA	9	Unclassified					
EPIL	8	UNCL	0				
NACA	7			Uses			
ALNE	6	Vegetation		FOOS			3
FEBR	3	ARTE	4	HERB			1
CAKI	2	ALNE	2				
MOCA	1			Vegetation			
<b>Context: 317</b>		<b>Context: 337</b>		ARTE			11
<b>Sample: 318/T</b>		No. taxa	4	MOAR			6
No. taxa	12			EPIL			4
		Unclassified		BIDE			3
Unclassified		UNCL	0	ALNE			2
UNCL	0						
Uses		Unclassified					
FOOS	6	UNCL	0	<b>Context: 351</b>		<b>Sample: 352/T</b>	

No. taxa	47	RHPR	12	<b>Context: 458</b>	<b>Sample: 459/T</b>
		BIDE	11	No. taxa	2
Unclassified		EPIL	10		
UNCL	0	ALNE	8	Ecology	
		PLAN	7	FUGE	3
Mosses		ISNA	6		
LIGN	3	PHRA	5	Vegetation	
SLIT	2	CAKI	4	SECA	5
HEMO	1	FEBR	2	CHEN	4
UNCL	0	MOCA	1	PLAN	3
Uses		<b>Context: 401</b>	<b>Sample: 727/T</b>	<b>Context: 493</b>	<b>Sample: 497/A</b>
FOOS	16	No. taxa	3	No. taxa	2
FOOO	1				
		Vegetation		Ecology	
Vegetation		CHEN	5	FUGE	3
CHEN	57	ISNA	3		
SECA	33	SECA	2	Vegetation	
ARTE	32			SECA	5
MOAR	17	<b>Context: 405</b>	<b>Sample: 498/T</b>	CHEN	4
QUFA	15	No. taxa	34	PLAN	3
RHPR	14				
PLAN	12	Unclassified		<b>Context: 541</b>	<b>Sample: 546/T</b>
BIDE	10	UNCL	0	No. taxa	2
FEBR	9				
PHRA	7	Mosses		Ecology	
ALNE	6	DUNS	2	FUGE	3
LITT	4				
TRGE	3	Uses			
CAKI	2	FOOS	11	Vegetation	
OXSP	1	HERB	1	SECA	3
				CHEN	2
<b>Context: 370</b>	<b>Sample: 391/T</b>				
No. taxa	41	Vegetation			
		ARTE	30		
Unclassified		CHEN	26		
UNCL	0	RHPR	16		
		QUFA	15		
Ecology		ALNE	13		
FUGE	3	EPIL	12		
Mosses		BIDE	10		
BOGS	3	ISNA	6		
GRAS	2	CAKI	4		
UNCL	0	MOCA	3		
		FEBR	2		
Uses		LITT	1		
FOOS	9				
FOOO	1	<b>Context: 455</b>	<b>Sample: 491/T</b>		
		No. taxa	1		
Vegetation					
CHEN	45	Vegetation			
ARTE	29	BIDE	2		
SECA	21				
QUFA	13				

<b>Context: 544</b>	<b>Sample: 566/T</b>			ISNA	7
No. taxa	1	<b>Context: 696</b>	<b>Sample:</b>	PHRA	4
		<b>697/TA</b>		POTA	3
Vegetation		No. taxa	1	CAKI	2
ALNE	2			SESL	1
ARTE	2	Uses			
EPIL	2	FOOS	1	<b>Context: 722</b>	<b>Sample: 723/T</b>
QUFA	2			No. taxa	0
RHPR	2	<b>Context: 712</b>	<b>Sample: 726/T</b>		
		No. taxa	1		
<b>Context: 567</b>	<b>Sample: 569/T</b>	Ecology			
No. taxa	3	FUGE	3		
		Vegetation			
Ecology		SECA	3		
FUGE	3	CHEN	2		
Vegetation		<b>Context: 716</b>	<b>Sample:</b>		
CHEN	5	<b>725/TA</b>			
ISNA	3	No. taxa	58		
MOCA	1				
<b>Context: 639</b>	<b>Sample: 645/T</b>	Unclassified			
No. taxa	4	UNCL	0		
		Ecology			
Unclassified		CALC	2		
UNCL	0				
Ecology		Mosses			
FUGE	6	BOGS	8		
		HEMO	7		
Vegetation		GRAS	6		
CHEN	8	WOOF	5		
PLAN	5	FENS	2		
EPIL	2	LIGN	1		
<b>Context: 680</b>	<b>Sample:</b>	UNCL	0		
<b>682/T1</b>		Uses			
No. taxa	8	FOOS	3		
		HERB	2		
Unclassified		FOOO	1		
UNCL	0				
Uses		Vegetation			
FOOS	6	CHEN	70		
WOOD	2	ARTE	42		
		BIDE	32		
		SECA	31		
Vegetation		MOAR	18		
CHAR	12	QUFA	15		
POTA	6	EPIL	14		
RHPR	4	RHPR	13		
QUFA	3	PLAN	10		
EPIL	2	NACA	9		
QUER	1	ALNE	8		

Table A3. Explanation of groups used in Table A2.

Ecology			grassland
CALC	Calcicolous plants	ISNA	Short-lived dwarf rush communities of winter-wet (often sandy) habitats, pond edges, etc.
FUGE	Calcifuge plants		
Mosses		LEMN	Free-floating aquatic communities of eutrophic waters
BOGS	Mosses found in bogs	LITT	Rooted aquatic vegetation at the edge of (usually) oligotrophic waters
DUNS	Mosses of dune-slacks	MOAR	Plants of grassland, including the wetter hay meadows and pastures, and adjacent paths
FENS	Mosses of fens	MOCA	Plants of oligotrophic springs and flushes, mainly upland
GRAS	Mosses of grassland	NACA	Plants of grass and dwarf-shrub- (typically <i>Calluna</i> -) dominated dry heaths and moors
HEMO	Mosses of heathland/moorland	OXSP	Plants of raised bogs and wet heaths
LIGN	Mosses of living and dead bark and wood	PHRA	Freshwater reedswamp communities
MARS	Mosses of marshes	PLAN	Plant communities of trampled places
OLIT	Mosses of drier, unshaded rocks, stones, and walls	POTA	Rooted aquatic vegetation of still or slow-moving water
SLIT	Mosses of shaded, moist rocks, stones, and walls	QUER	Deciduous woodland on poorer soils
SOIL	Mosses of bare, usually well-drained soil in unshaded places	QUFA	Deciduous woodland on better soils
WOOF	Mosses of woodland floor habitats, principally humus and litter	RHPR	Woodland edge scrub communities
Uses		RUPP	Submerged communities of brackish water
FOOO	Plants with oil-seeds	SCCA	Communities of poor and intermediate fens (acid to mildly basic peat)
FOOS	Plants forming a major component of diet - cereals, pulses, nuts, fruit, vegetables	SECA	Weeds of cereal fields
HERB	Plants used for medicinal purposes	SESC	Established vegetation of sand dunes and other sandy acidic soils
USEF	Plants useful in some way other than those already defined	SESL	Montane dwarf-shrub heaths and grassland, mainly on calcareous substrates (some taxa not exclusively montane)
WOOD	Parts of woody plants other than fruits/seeds	TRGE	Species rich communities of grassland/scrub boundaries, often calcicolous
Vegetation			
ALNE	Plants of alder carr		
ARTE	Nitrophilous tall-herb weed communities of waste places, river banks, waysides and hedgerows		
BIDE	Nitrophilous weed communities of pond edges, ditches and other places subject to periodic inundation		
CAKI	Nitrophilous weedy communities of shingle beaches and sandy strandlines		
CHAR	Submerged aquatic vegetation dominated by Characeae		
CHEN	Nitrophilous weed communities of cultivated and other disturbed land (especially rootcrop fields and gardens)		
EPIL	Nitrophilous woodland edge and clearing communities		
FEBR	Plants of drier, typically calcareous,		

## Insect data

*Table A4. Main statistics and species lists in rank order for the scan, rapid-scan and semi-quantitatively rapid-scan recorded assemblages from Ribchester, Lancashire. Nomenclature follows Kloet and Hincks (1964-77). Main statistics (other than S and N) are given only where N was greater than 9.*

**Site: LEV92; Context: 11; Sample: 12/T**

NO RECORDS OF BEETLES OR BUGS

NO RECORDS OF BEETLES OR BUGS

**Site: LEV92; Context: 97; Sample: 112/T**

**Site: LEV92; Context: 13; Sample: 14/T**

NO RECORDS OF BEETLES OR BUGS

NO RECORDS OF BEETLES OR BUGS

**Site: LEV92 Context: 202 Sample: 270/T - beetle/bug main statistics**

**Site: LEV92; Context: 11; Sample: 15/T**

Erosion = 4; Fragmentation = 4; Weight = 1.000kg

NO RECORDS OF BEETLES OR BUGS

Number of individuals estimated as N = 17

Number of taxa S = 17

**Site: LEV92 Context: 43 Sample: 107/T - beetle/bug main statistics**

Index of diversity not calculated,  $n = s$  or  $n < 20$

Number of 'certain' outdoor taxa SOA = 11

Percentage of 'certain' outdoor taxa %SOA = 65

Number of 'certain' outdoor individuals NOA = 11

Percentage of 'certain' outdoor individuals %NOA = 65

Erosion = 0 Fragmentation = 0; Weight = 1.000kg

Number of individuals estimated as N = 1

Number of 'certain' and probable outdoor taxa SOB = 12

Number of taxa S = 1

Percentage of 'certain' and probable outdoor taxa %SOB = 71

Number of 'certain' and probable outdoor individuals NOB = 12

Percentage 'certain' and probable outdoor individuals %NOB = 71

**Site: LEV92 Context: 43 Sample: 107/T - species list in rank order**

Diversity index for OB not calculated,  $NOB = SOB$  or  $NOB < 20$

Taxon	n	%	R	Ecodes
-------	---	---	---	--------

Number of aquatic taxa SW = 3

Percentage of aquatic taxa %SW = 18

Number of aquatic individuals NW = 3

Percentage of aquatic individuals %NW = 18

Coleoptera sp.	1	100	1	u
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Number of damp ground/waterside taxa SD = 1

Percentage of damp ground/waterside taxa %SD = 6

Number of damp ground/waterside individuals ND = 1

Percentage of damp ground/waterside individuals %ND = 6

**Site: LEV92; Context: 47; Sample: 108/B**

NO RECORDS OF BEETLES OR BUGS

Number of strongly plant-associated taxa SP = 6

Percentage of strongly plant-associated taxa %SP = 35

Number of strongly plant-associated individuals NP = 6

Percentage of strongly plant-associated individuals %NP = 35

**Site: LEV92; Context: 68; Sample: 88/T**

NO RECORDS OF BEETLES OR BUGS

Number of heathland/moorland taxa SM = 0

Number of heathland/moorland individuals NM = 0

Percentage of heathland/moorland individuals %NM = 0

**Site: LEV92; Context: 74; Sample: 78/T**

NO RECORDS OF BEETLES OR BUGS

Number of wood-associated taxa SL = 0

Number of wood-associated individuals NL = 0

Percentage of wood-associated individuals %NL = 0

**Site: LEV92; Context: 90; Sample: 143/TA**

Number of decomposer taxa SRT = 1

Percentage of decomposer taxa %SRT = 6

Number of decomposer individuals	NRT = 1	Number of 'certain' and probable outdoor taxa	SOB = 8
Percentage of decomposer individuals	%NRT = 6	Percentage of 'certain' and probable outdoor taxa	%SOB = 62
Number of 'dry' decomposer taxa	SRD = 0	Number of 'certain' and probable outdoor individuals	NOB = 8
Percentage of 'dry' decomposer taxa	%SRD = 0	Percentage 'certain' and probable outdoor individuals	%NOB = 62
Number of 'dry' decomposer individuals	NRD = 0	Diversity index for OB not calculated, NOB = SOB or NOB < 20	
Percentage of 'dry' decomposer individuals	%NRD = 0	Number of aquatic taxa	SW = 1
Number of 'foul' decomposer taxa	SRF = 0	Percentage of aquatic taxa	%SW = 8
Percentage of 'foul' decomposer taxa	%SRF = 0	Number of aquatic individuals	NW = 1
Number of 'foul' decomposer individuals	NRF = 0	Percentage of aquatic individuals	%NW = 8
Percentage of 'foul' decomposer individuals	%NRF = 0	Number of damp ground/waterside taxa	SD = 0
Diversity index for RT not calculated, NRT = SRT or NRT < 20		Percentage of damp ground/waterside taxa	%SD = 0
Number of individuals of grain pests	NG = 0	Number of damp ground/waterside individuals	ND = 0
Percentage of individuals of grain pests	%NG = 0	Percentage of damp ground/waterside individuals	%ND = 0
Number of individuals of grain pests	NG = 0	Number of strongly plant-associated taxa	SP = 3
Number of uncoded taxa	SU = 4	Percentage of strongly plant-associated taxa	%SP = 23
Percentage of uncoded individuals	PNU = 24	Number of strongly plant-associated individuals	NP = 3
		Percentage of strongly plant-associated individuals	%NP = 23
		Number of heathland/moorland taxa	SM = 0
		Number of heathland/moorland individuals	NM = 0
		Percentage of heathland/moorland individuals	%NM = 0
		Number of wood-associated taxa	SL = 0
		Number of wood-associated individuals	NL = 0
		Percentage of wood-associated individuals	%NL = 0
		Number of decomposer taxa	SRT = 3
		Percentage of decomposer taxa	%SRT = 23
		Number of decomposer individuals	NRT = 3
		Percentage of decomposer individuals	%NRT = 23
		Number of 'dry' decomposer taxa	SRD = 0
		Percentage of 'dry' decomposer taxa	%SRD = 0
		Number of 'dry' decomposer individuals	NRD = 0
		Percentage of 'dry' decomposer individuals	%NRD = 0
		Number of 'foul' decomposer taxa	SRF = 1
		Percentage of 'foul' decomposer taxa	%SRF = 8
		Number of 'foul' decomposer individuals	NRF = 1
		Percentage of 'foul' decomposer individuals	%NRF = 8
		Diversity index for RT not calculated, NRT = SRT or NRT < 20	
		Number of individuals of grain pests	NG = 0
		Percentage of individuals of grain pests	%NG = 0
		Number of individuals of grain pests	NG = 0
		Number of uncoded taxa	SU = 3
		Percentage of uncoded individuals	PNU = 23

**Site: LEV92 Context: 202 Sample: 270/T - species list in rank order**

Taxon	n	%	R	Ecodes
Scolopostethus sp.	1	6	1	oa p
Corixidae sp.	1	6	1	oa w
Philaenus or Neophilaenus sp.	1	6	1	oa p
Auchenorhyncha sp.	1	6	1	oa p
Colymbetes fuscus (Linnaeus)	1	6	1	oa w
Cercyon sp.	1	6	1	u
Megasternum obscurum (Marsham)	1	6	1	rt
Dytiscidae sp. or Hydrophilidae sp.	1	6	1	oa w
?Ptomaphagus sp.	1	6	1	u
Omaliinae sp.	1	6	1	u
Tachinus sp.	1	6	1	u
Elateridae sp.	1	6	1	ob
Apion sp.	1	6	1	oa p
Notaris acridulus (Linnaeus)	1	6	1	oa d p
Ceutorhynchus sp.	1	6	1	oa p
Curculionidae sp. A	1	6	1	oa
Curculionidae sp. B	1	6	1	oa

**Site: LEV92 Context: 202 Sample: 271/T - beetle/bug main statistics**

Erosion = 1 Fragmentation = 1; Weight = 1.000kg

Number of individuals estimated as	N = 13
Number of taxa	S = 13
Index of diversity not calculated, n = s or n < 20	
Number of 'certain' outdoor taxa	SOA = 5
Percentage of 'certain' outdoor taxa	%SOA = 38
Number of 'certain' outdoor individuals	NOA = 5
Percentage of 'certain' outdoor individuals	%NOA = 38

**Site: LEV92 Context: 202 Sample: 271/T - species list in rank order**

Taxon	n	%	R	Ecodes
Lygaeidae sp.	1	8	1	oa p
Carabidae sp.	1	8	1	ob
Helophorus sp.	1	8	1	oa w
Cercyon sp.	1	8	1	u
Megasternum obscurum (Marsham)	1	8	1	rt
Onthophilus striatus (Forster)	1	8	1	rt
Tachinus ?signatus Gravenhorst	1	8	1	u
Aphodius sp.	1	8	1	ob rf
Elateridae sp.	1	8	1	ob
Chrysomelinae sp.	1	8	1	oa p
Ceutorhynchus sp.	1	8	1	oa p
Curculionidae sp.	1	8	1	oa
Coleoptera sp.	1	8	1	u

**Site: LEV92 Context: 258 Sample: 374/T - beetle/bug main statistics**

Erosion = 4 Fragmentation = 3; Weight = 1.000kg

Number of individuals estimated as	N = 24
Number of taxa	S = 24
Index of diversity not calculated, n = s or n < 20	
Number of 'certain' outdoor taxa	SOA = 9
Percentage of 'certain' outdoor taxa	%SOA = 38
Number of 'certain' outdoor individuals	NOA = 9
Percentage of 'certain' outdoor individuals	%NOA = 38
Number of 'certain' and probable outdoor taxa	SOB = 13
Percentage of 'certain' and probable outdoor taxa	%SOB = 54
Number of 'certain' and probable outdoor individuals	NOB = 13
Percentage 'certain' and probable outdoor individuals	%NOB = 54
Diversity index for OB not calculated, NOB = SOB or NOB < 20	
Number of aquatic taxa	SW = 1
Percentage of aquatic taxa	%SW = 4
Number of aquatic individuals	NW = 1
Percentage of aquatic individuals	%NW = 4
Number of damp ground/waterside taxa	SD = 2
Percentage of damp ground/waterside taxa	%SD = 8
Number of damp ground/waterside individuals	ND = 2
Percentage of damp ground/waterside individuals	%ND = 8
Number of strongly plant-associated taxa	SP = 4
Percentage of strongly plant-associated taxa	%SP = 17
Number of strongly plant-associated individuals	NP = 4
Percentage of strongly plant-associated individuals	%NP = 17
Number of heathland/moorland taxa	SM = 0
Number of heathland/moorland individuals	NM = 0
Percentage of heathland/moorland individuals	%NM = 0
Number of wood-associated taxa	SL = 0
Number of wood-associated individuals	NL = 0
Percentage of wood-associated individuals	%NL = 0

Number of decomposer taxa	SRT = 7
Percentage of decomposer taxa	%SRT = 29
Number of decomposer individuals	NRT = 7
Percentage of decomposer individuals	%NRT = 29
Number of 'dry' decomposer taxa	SRD = 2
Percentage of 'dry' decomposer taxa	%SRD = 8
Number of 'dry' decomposer individuals	NRD = 2
Percentage of 'dry' decomposer individuals	%NRD = 8
Number of 'foul' decomposer taxa	SRF = 1
Percentage of 'foul' decomposer taxa	%SRF = 4
Number of 'foul' decomposer individuals	NRF = 1
Percentage of 'foul' decomposer individuals	%NRF = 4
Diversity index for RT not calculated, NRT = SRT or NRT < 20	
Number of individuals of grain pests	NG = 0
Percentage of individuals of grain pests	%NG = 0
Number of individuals of grain pests	NG = 0
Number of uncoded taxa	SU = 5
Percentage of uncoded individuals	PNU = 21

**Site: LEV92 Context: 258 Sample: 374/T - species list in rank order**

Taxon	n	%	R
Stygnocoris ?pedestris (Fallen)	1	4	1 oa p
Lygaeidae sp.	1	4	1 oa p
Auchenorhyncha sp.	1	4	1 oa p
Dyschirius ?globosus (Herbst)	1	4	1 oa
Carabidae sp. A	1	4	1 ob
Carabidae sp. B	1	4	1 ob
Helophorus sp.	1	4	1 oa w
Megasternum obscurum (Marsham)	1	4	1 rt
?Lesteva sp.	1	4	1 oa d
Omalinae sp.	1	4	1 u
Platystethus nitens (Sahlberg)	1	4	1 oa d
Anotylus rugosus (Fabricius)	1	4	1 rt
Anotylus sculpturatus group	1	4	1 rt
Stenus sp.	1	4	1 u
Xantholinus gallicus or linearis	1	4	1 rt
Tachinus sp.	1	4	1 u
Aphodius sp.	1	4	1 ob rf
Elateridae sp.	1	4	1 ob
Atomaria sp.	1	4	1 rd
Ephistemus globulus (Paykull)	1	4	1 rd
Chrysomelinae sp.	1	4	1 oa p
Curculionidae sp.	1	4	1 oa
Coleoptera sp. A	1	4	1 u
Coleoptera sp. B	1	4	1 u

**Site: LEV92 Context: 258 Sample: 375/TA - beetle/bug main statistics**

Erosion = 3 Fragmentation = 3; Weight = 1.000kg

		<b>Site: LEV92 Context: 258 Sample: 375/TA - species list in rank order</b>				
		Taxon	n	%	R	Ecodes
Number of individuals estimated as	N = 96					
Number of taxa	S = 78					
Index of diversity (alpha)	alpha = 193					
Standard error of alpha	SE alpha = 49					
Number of 'certain' outdoor taxa	SOA = 36	Ochthebius minimus (Fabricius)	5	5	1	oa w
Percentage of 'certain' outdoor taxa	%SOA = 46	Stygnocoris ?pedestris (Fallen)	3	3	2	oa p
Number of 'certain' outdoor individuals	NOA = 44	Anotylus nitidulus (Gravenhorst)	3	3	2	rt d
Percentage of 'certain' outdoor individuals	%NOA = 46	?Drymus sp.	2	2	4	oa p
Number of 'certain' and probable outdoor taxa	SOB = 40	Megasternum obscurum (Marshall)	2	2	4	rt
Percentage of 'certain' and probable outdoor taxa	%SOB = 51	Carpelimus sp.	2	2	4	u
Number of 'certain' and probable outdoor individuals	NOB = 49	Anotylus rugosus (Fabricius)	2	2	4	rt
Percentage 'certain' and probable outdoor individuals	%NOB = 51	Anotylus sculpturatus group	2	2	4	rt
Index of diversity of outdoor component	alpha OB = 100	Xantholinus ?linearis (Olivier)	2	2	4	rt
Standard error	SE alpha OB = 36	Falagria or Cordalia sp.	2	2	4	rt
Number of aquatic taxa	SW = 8	Aleocharinae sp. A	2	2	4	u
Percentage of aquatic taxa	%SW = 10	Aphodius sp. B	2	2	4	ob rf
Number of aquatic individuals	NW = 13	Tanysphyrus lemnae (Paykull)	2	2	4	oa w p
Percentage of aquatic individuals	%NW = 14	Pentatomidae sp.	1	1	14	oa p
Number of damp ground/waterside taxa	SD = 8	?Stygnocoris sp.	1	1	14	oa
Percentage of damp ground/waterside taxa	%SD = 10	Scolopostethus sp.	1	1	14	oa p
Number of damp ground/waterside individuals	ND = 10	Anthocoris sp.	1	1	14	oa p
Percentage of damp ground/waterside individuals	%ND = 10	Saldidae sp.	1	1	14	oa d
Number of strongly plant-associated taxa	SP = 15	Aphrodes flavostriatus (Donovan)	1	1	14	oa p d
Percentage of strongly plant-associated taxa	%SP = 19	Auchenorhyncha sp.	1	1	14	oa p
Number of strongly plant-associated individuals	NP = 19	Psylla sp.	1	1	14	oa p
Percentage of strongly plant-associated individuals	%NP = 20	Trechus obtusus or quadristriatus	1	1	14	oa
Number of heathland/moorland taxa	SM = 0	Bembidion sp.	1	1	14	oa
Number of heathland/moorland individuals	NM = 0	Pterostichus cupreus (Linnaeus)	1	1	14	oa
Percentage of heathland/moorland individuals	%NM = 0	Harpalus sp.	1	1	14	oa
Number of wood-associated taxa	SL = 0	Dromius ?melanocephalus Dejean	1	1	14	oa
Number of wood-associated individuals	NL = 0	Carabidae sp.	1	1	14	ob
Percentage of wood-associated individuals	%NL = 0	Hydroporus sp.	1	1	14	oa w
Number of decomposer taxa	SRT = 23	Colymbetinae sp.	1	1	14	oa w
Percentage of decomposer taxa	%SRT = 29	Helophorus aquaticus (Linnaeus)	1	1	14	oa w
Number of decomposer individuals	NRT = 31	Helophorus nubilus Fabricius	1	1	14	oa
Percentage of decomposer individuals	%NRT = 32	Helophorus sp.	1	1	14	oa w
Number of 'dry' decomposer taxa	SRD = 2	Cercyon ?tristis (Illiger)	1	1	14	oa d
Percentage of 'dry' decomposer taxa	%SRD = 3	Cercyon ustulatus (Preyssler)	1	1	14	oa d
Number of 'dry' decomposer individuals	NRD = 2	Cercyon sp.	1	1	14	u
Percentage of 'dry' decomposer individuals	%NRD = 2	Hydrobius fuscipes (Linnaeus)	1	1	14	oa w
Number of 'foul' decomposer taxa	SRF = 3	Hydrophilinae sp.	1	1	14	oa w
Percentage of 'foul' decomposer taxa	%SRF = 4	Onthophilus striatus (Forster)	1	1	14	rt
Number of 'foul' decomposer individuals	NRF = 4	Ptenidium sp.	1	1	14	rt
Percentage of 'foul' decomposer individuals	%NRF = 4	Acrotichis sp.	1	1	14	rt
Index of diversity of decomposer component	alpha RT = 41	Catops sp.	1	1	14	u
Standard error	SE alpha RT = 17	Micropeplus sp.	1	1	14	rt
Number of individuals of grain pests	NG = 0	Megarthus sp.	1	1	14	rt
Percentage of individuals of grain pests	%NG = 0	Anthobium sp.	1	1	14	oa
Number of individuals of grain pests	NG = 0	Omalium caesum or italicum	1	1	14	rt
Number of uncoded taxa	SU = 17	Omalium ?rivulare (Paykull)	1	1	14	rt
Percentage of uncoded individuals	PNU = 20	Aploderus caelatus (Gravenhorst)	1	1	14	rt
		Platystethus arenarius (Fourcroy)	1	1	14	rf
		Platystethus cornutus group	1	1	14	oa d



Platystethus nitens (Sahlberg)	1	1	14	oa d	Number of damp ground/waterside taxa	SD = 3
Oxytelus ?sculptus Gravenhorst	1	1	14	rt	Percentage of damp ground/waterside taxa	%SD = 8
Stenus sp. A	1	1	14	u	Number of damp ground/waterside individuals	ND = 4
Stenus sp. B	1	1	14	u	Percentage of damp ground/waterside individuals	%ND = 9
Xantholinus sp.	1	1	14	u	Number of strongly plant-associated taxa	SP = 9
Philonthus sp.	1	1	14	u	Percentage of strongly plant-associated taxa	%SP = 23
Tachyporus sp.	1	1	14	u	Number of strongly plant-associated individuals	NP = 11
?Oxypoda sp.	1	1	14	u	Percentage of strongly plant-associated individuals	%NP = 25
Aleocharinae sp. B	1	1	14	u	Number of heathland/moorland taxa	SM = 0
Aleocharinae sp. C	1	1	14	u	Number of heathland/moorland individuals	NM = 0
Aleocharinae sp. D	1	1	14	u	Percentage of heathland/moorland individuals	%NM = 0
Aleocharinae sp. E	1	1	14	u	Number of wood-associated taxa	SL = 0
Staphylinidae sp.	1	1	14	u	Number of wood-associated individuals	NL = 0
Aphodius sp. A	1	1	14	ob rf	Percentage of wood-associated individuals	%NL = 0
Phyllopertha horticola (Linnaeus)	1	1	14	oa p	Number of decomposer taxa	SRT = 10
?Cyphon sp.	1	1	14	oa d	Percentage of decomposer taxa	%SRT = 26
Elateridae sp.	1	1	14	ob	Number of decomposer individuals	NRT = 13
Brachyterus sp.	1	1	14	oa p	Percentage of decomposer individuals	%NRT = 30
Nitidulidae sp.	1	1	14	u	Number of 'dry' decomposer taxa	SRD = 1
Atomaria sp.	1	1	14	rd	Percentage of 'dry' decomposer taxa	%SRD = 3
Phalacridae sp.	1	1	14	oa p	Number of 'dry' decomposer individuals	NRD = 1
Orthoperus sp.	1	1	14	rt	Percentage of 'dry' decomposer individuals	%NRD = 2
Coccinellidae sp.	1	1	14	oa p	Number of 'foul' decomposer taxa	SRF = 2
Lathridius minutus group	1	1	14	rd	Percentage of 'foul' decomposer taxa	%SRF = 5
Enicmus histrio/transversus.	1	1	14	rt	Number of 'foul' decomposer individuals	NRF = 3
Lathridiidae sp.	1	1	14	rt	Percentage of 'foul' decomposer individuals	%NRF = 7
Aphthona sp.	1	1	14	oa p	Diversity index for RT not calculated, NRT = SRT or NRT < 20	
?Phyllobius or Polydrusus sp.	1	1	14	oa p	Number of individuals of grain pests	NG = 1
Coleoptera sp.	1	1	14	u	Percentage of individuals of grain pests	%NG = 2
					Number of individuals of grain pests	NG = 1
					Number of uncoded taxa	SU = 9
					Percentage of uncoded individuals	PNU = 20

**Site: LEV92 Context: 290 Sample: 288/TA - beetle/bug main statistics**

Erosion = 2 Fragmentation = 3; Weight = 1.000kg

Number of individuals estimated as	N = 44
Number of taxa	S = 39
Index of diversity (alpha)	alpha = 161
Standard error of alpha	SE alpha = 74
Number of 'certain' outdoor taxa	SOA = 18
Percentage of 'certain' outdoor taxa	%SOA = 46
Number of 'certain' outdoor individuals	NOA = 20
Percentage of 'certain' outdoor individuals	%NOA = 45
Number of 'certain' and probable outdoor taxa	SOB = 21
Percentage of 'certain' and probable outdoor taxa	%SOB = 54
Number of 'certain' and probable outdoor individuals	NOB = 24
Percentage 'certain' and probable outdoor individuals	%NOB = 55
Index of diversity of outdoor component	alpha OB = 77
Standard error	SE alpha OB = 45
Number of aquatic taxa	SW = 5
Percentage of aquatic taxa	%SW = 13
Number of aquatic individuals	NW = 5
Percentage of aquatic individuals	%NW = 11

**Site: LEV92 Context: 290 Sample: 288/TA - species list in rank order**

Taxon	n	%	R	Ecodes
Brachyterus sp.	3	7	1	oa p
Anotylus nitidulus (Gravenhorst)	2	5	2	rt d
Xantholinus ?linearis (Olivier)	2	5	2	rt
Aphodius sp. A	2	5	2	ob rf
Heterogaster urticae (Fabricius)	1	2	5	oa p
Scolopostethus sp.	1	2	5	oa p
Auchenorhyncha sp.	1	2	5	oa p
Hygrotus sp.	1	2	5	oa w
Helophorus sp.	1	2	5	oa w
Cercyon sp.	1	2	5	u
Megasternum obscurum (Marsham)	1	2	5	rt
Hydrobius fuscipes (Linnaeus)	1	2	5	oa w
Laccobius sp.	1	2	5	oa w
Enochrus sp.	1	2	5	oa w
Lesteva ?longoelytrata (Goeze)	1	2	5	oa d

?Carpelimus sp.	1	2	5	u	Percentage of strongly plant-associated individuals	%NP = 42
Platystethus nitens (Sahlberg)	1	2	5	oa d	Number of heathland/moorland taxa	SM = 0
Anotylus sculpturatus group	1	2	5	rt	Number of heathland/moorland individuals	NM = 0
Cordalia obscura (Gravenhorst)	1	2	5	rt	Percentage of heathland/moorland individuals	%NM = 0
Oxypoda sp.	1	2	5	u	Number of wood-associated taxa	SL = 0
Aleocharinae sp. A	1	2	5	u	Number of wood-associated individuals	NL = 0
Aleocharinae sp. B	1	2	5	u	Percentage of wood-associated individuals	%NL = 0
Aleocharinae sp. C	1	2	5	u	Number of decomposer taxa	SRT = 2
Aleocharinae sp. D	1	2	5	u	Percentage of decomposer taxa	%SRT = 17
Aleocharinae sp. E	1	2	5	u	Number of decomposer individuals	NRT = 2
Tychus ?niger (Paykull)	1	2	5	u	Percentage of decomposer individuals	%NRT = 17
Aphodius sp. B	1	2	5	ob rf	Number of 'dry' decomposer taxa	SRD = 0
Oxyomus sylvestris (Scopoli)	1	2	5	rt	Percentage of 'dry' decomposer taxa	%SRD = 0
Agrypnus murinus (Linnaeus)	1	2	5	oa p	Number of 'dry' decomposer individuals	NRD = 0
?Athous sp.	1	2	5	oa p	Percentage of 'dry' decomposer individuals	%NRD = 0
Selatosomus ?incanus (Gyllenhal)	1	2	5	oa	Number of 'foul' decomposer taxa	SRF = 2
Elateridae sp.	1	2	5	ob	Percentage of 'foul' decomposer taxa	%SRF = 17
Atomaria sp.	1	2	5	rd	Number of 'foul' decomposer individuals	NRF = 2
Orthoperus sp.	1	2	5	rt	Percentage of 'foul' decomposer individuals	%NRF = 17
Chrysomelinae sp.	1	2	5	oa p	Diversity index for RT not calculated, NRT = SRT or NRT < 20	
Sitophilus granarius (Linnaeus)	1	2	5	g	Number of individuals of grain pests	NG = 0
Ceutorhynchus ?floralis (Paykull)	1	2	5	oa p	Percentage of individuals of grain pests	%NG = 0
Ceuthorhynchinae sp.	1	2	5	oa p	Number of individuals of grain pests	NG = 0
Curculionidae sp.	1	2	5	oa	Number of uncoded taxa	SU = 1
					Percentage of uncoded individuals	PNU = 8

**Site: LEV92 Context: 317 Sample: 318/T - beetle/bug main statistics**

Erosion = 4 Fragmentation = 4; Weight = 1.000kg

Number of individuals estimated as	N = 12
Number of taxa	S = 12
Index of diversity not calculated, n = s or n < 20	
Number of 'certain' outdoor taxa	SOA = 8
Percentage of 'certain' outdoor taxa	%SOA = 67
Number of 'certain' outdoor individuals	NOA = 8
Percentage of 'certain' outdoor individuals	%NOA = 67
Number of 'certain' and probable outdoor taxa	SOB = 11
Percentage of 'certain' and probable outdoor taxa	%SOB = 92
Number of 'certain' and probable outdoor individuals	NOB = 11
Percentage 'certain' and probable outdoor individuals	%NOB = 92
Diversity index for OB not calculated, NOB = SOB or NOB < 20	
Number of aquatic taxa	SW = 2
Percentage of aquatic taxa	%SW = 17
Number of aquatic individuals	NW = 2
Percentage of aquatic individuals	%NW = 17
Number of damp ground/waterside taxa	SD = 2
Percentage of damp ground/waterside taxa	%SD = 17
Number of damp ground/waterside individuals	ND = 2
Percentage of damp ground/waterside individuals	%ND = 17
Number of strongly plant-associated taxa	SP = 5
Percentage of strongly plant-associated taxa	%SP = 42
Number of strongly plant-associated individuals	NP = 5

**Site: LEV92 Context: 317 Sample: 318/T - species list in rank order**

Taxon	n	%	R	Ecodes
Colymbetinae sp.	1	8	1	oa w
Histerinae sp.	1	8	1	u
Aphodius sp. A	1	8	1	ob rf
Aphodius sp. B	1	8	1	ob rf
Phyllopertha horticola (Linnaeus)	1	8	1	oa p
Dryops sp.	1	8	1	oa d
?Elateridae sp.	1	8	1	ob
Tanysphyrus lemnae (Paykull)	1	8	1	oa w p
Notaris sp.	1	8	1	oa d p
Cidnorhinus quadrimaculatus (Linnaeus)	1	8	1	oa p
Ceuthorhynchinae sp.	1	8	1	oa p
Curculionidae sp.	1	8	1	oa

**Site: LEV92 Context: 317 Sample: 319/T - beetle/bug main statistics**

Erosion = 3 Fragmentation = 3; Weight = 1.000kg

Number of individuals estimated as	N = 61
Number of taxa	S = 58
Index of diversity (alpha)	alpha = 560

Standard error of alpha	SE alpha = 317	Brachypterus sp.	3	5	1	oa p
Number of 'certain' outdoor taxa	SOA = 28	Enicmus sp.	2	3	2	rt
Percentage of 'certain' outdoor taxa	%SOA = 48	Heterogaster urticae (Fabricius)	1	2	3	oa p
Number of 'certain' outdoor individuals	NOA = 30	Globiceps sp.	1	2	3	oa p
Percentage of 'certain' outdoor individuals	%NOA = 49	Aphrodes sp.	1	2	3	oa p
Number of 'certain' and probable outdoor taxa	SOB = 35	Auchenorhyncha sp.	1	2	3	oa p
Percentage of 'certain' and probable outdoor taxa	%SOB = 60	Clivina ?fossor (Linnaeus)	1	2	3	oa
Number of 'certain' and probable outdoor individuals	NOB = 37	Bembidion sp.	1	2	3	oa
Percentage 'certain' and probable outdoor individuals	%NOB = 61	Pterostichus melanarius (Illiger)	1	2	3	ob
Index of diversity of outdoor component	alpha OB = 302	?Harpalus sp.	1	2	3	oa
Standard error	SE alpha OB = 205	Carabidae sp. A	1	2	3	ob
Number of aquatic taxa	SW = 5	Carabidae sp. B	1	2	3	ob
Percentage of aquatic taxa	%SW = 9	Hydroporinae sp.	1	2	3	oa w
Number of aquatic individuals	NW = 5	Helophorus sp.	1	2	3	oa w
Percentage of aquatic individuals	%NW = 8	Cercyon terminatus (Marsham)	1	2	3	rf
Number of damp ground/waterside taxa	SD = 2	Cercyon sp.	1	2	3	u
Percentage of damp ground/waterside taxa	%SD = 3	Megasternum obscurum (Marsham)	1	2	3	rt
Number of damp ground/waterside individuals	ND = 2	Hydrophilinae sp.	1	2	3	oa w
Percentage of damp ground/waterside individuals	%ND = 3	Onthophilus striatus (Forster)	1	2	3	rt
Number of strongly plant-associated taxa	SP = 14	Limnebius sp.	1	2	3	oa w
Percentage of strongly plant-associated taxa	%SP = 24	Colon sp.	1	2	3	u
Number of strongly plant-associated individuals	NP = 16	Micropeplus staphylinoides (Marsham)	1	2	3	rt
Percentage of strongly plant-associated individuals	%NP = 26	Olophrum sp.	1	2	3	oa
Number of heathland/moorland taxa	SM = 0	Acidota cruentata Mannerheim	1	2	3	oa
Number of heathland/moorland individuals	NM = 0	Platystethus nitens (Sahlberg)	1	2	3	oa d
Percentage of heathland/moorland individuals	%NM = 0	Anotylus rugosus (Fabricius)	1	2	3	rt
Number of wood-associated taxa	SL = 0	Anotylus sculpturatus group	1	2	3	rt
Number of wood-associated individuals	NL = 0	Lathrobium sp.	1	2	3	u
Percentage of wood-associated individuals	%NL = 0	Quedius sp.	1	2	3	u
Number of decomposer taxa	SRT = 15	Staphylininae sp.	1	2	3	u
Percentage of decomposer taxa	%SRT = 26	Tachyporus sp.	1	2	3	u
Number of decomposer individuals	NRT = 16	Tachinus sp.	1	2	3	u
Percentage of decomposer individuals	%NRT = 26	Falagria ?thoracica Stephens	1	2	3	rt
Number of 'dry' decomposer taxa	SRD = 1	Aleocharinae sp. A	1	2	3	u
Percentage of 'dry' decomposer taxa	%SRD = 2	Aleocharinae sp. B	1	2	3	u
Number of 'dry' decomposer individuals	NRD = 1	Aleocharinae sp. C	1	2	3	u
Percentage of 'dry' decomposer individuals	%NRD = 2	Aphodius ?contaminatus (Herbst)	1	2	3	oa rf
Number of 'foul' decomposer taxa	SRF = 4	Aphodius sp. A	1	2	3	ob rf
Percentage of 'foul' decomposer taxa	%SRF = 7	Aphodius sp. B	1	2	3	ob rf
Number of 'foul' decomposer individuals	NRF = 4	Oxyomus sylvestris (Scopoli)	1	2	3	rt
Percentage of 'foul' decomposer individuals	%NRF = 7	Phyllopertha horticola (Linnaeus)	1	2	3	oa p
Diversity index for RT not calculated, NRT = SRT or NRT < 20		Cyphon sp.	1	2	3	oa d
Number of individuals of grain pests	NG = 0	Elateridae sp.	1	2	3	ob
Percentage of individuals of grain pests	%NG = 0	Cantharidae sp.	1	2	3	ob
Number of individuals of grain pests	NG = 0	Meligethes sp. A	1	2	3	oa p
Number of uncoded taxa	SU = 11	Meligethes sp. B	1	2	3	oa p
Percentage of uncoded individuals	PNU = 18	Nitidulidae sp.	1	2	3	u
		Atomaria sp.	1	2	3	rd
		Orthoperus sp.	1	2	3	rt
		Corticariinae sp.	1	2	3	rt
		Chrysomelinae sp.	1	2	3	oa p
		Apion sp.	1	2	3	oa p
Taxon	n % R Ecodes	Tanysphyrus lemnae (Paykull)	1	2	3	oa w p
		Cidnorhinus quadrimaculatus (Linnaeus)	1	2	3	oa p

Ceutorhynchus sp.	1	2	3	oa p
Ceuthorhynchinae sp.	1	2	3	oa p
Curculionidae sp. A	1	2	3	oa
Curculionidae sp. B	1	2	3	oa

**Site: LEV92 Context: 351 Sample: 352/T - beetle/bug main statistics**

Erosion = 4 Fragmentation = 3; Weight = 3.000kg

**Site: LEV92; Context: 336; Sample: 430/T**

NO RECORDS OF BEETLES OR BUGS

**Site: LEV92; Context: 337; Sample: 382/T**

NO RECORDS OF BEETLES OR BUGS

**Site: LEV92; Context: 337; Sample: 383/T**

NO RECORDS OF BEETLES OR BUGS

**Site: LEV92; Context: 337; Sample: 673/T**

NO RECORDS OF BEETLES OR BUGS

**Site: LEV92; Context: 345; Sample: 638/T**

NO RECORDS OF BEETLES OR BUGS

Number of individuals estimated as	N = 181
Number of taxa	S = 105
Index of diversity (alpha)	alpha = 104
Standard error of alpha	SE alpha = 14
Number of 'certain' outdoor taxa	SOA = 55
Percentage of 'certain' outdoor taxa	%SOA = 52
Number of 'certain' outdoor individuals	NOA = 78
Percentage of 'certain' outdoor individuals	%NOA = 43
Number of 'certain' and probable outdoor taxa	SOB = 58
Percentage of 'certain' and probable outdoor taxa	%SOB = 55
Number of 'certain' and probable outdoor individuals	NOB = 82
Percentage 'certain' and probable outdoor individuals	%NOB = 45
Index of diversity of outdoor component	alpha OB = 88
Standard error	SE alpha OB = 20
Number of aquatic taxa	SW = 5
Percentage of aquatic taxa	%SW = 5
Number of aquatic individuals	NW = 7
Percentage of aquatic individuals	%NW = 4
Number of damp ground/waterside taxa	SD = 10
Percentage of damp ground/waterside taxa	%SD = 10
Number of damp ground/waterside individuals	ND = 28
Percentage of damp ground/waterside individuals	%ND = 15
Number of strongly plant-associated taxa	SP = 29
Percentage of strongly plant-associated taxa	%SP = 28
Number of strongly plant-associated individuals	NP = 37
Percentage of strongly plant-associated individuals	%NP = 20
Number of heathland/moorland taxa	SM = 0
Number of heathland/moorland individuals	NM = 0
Percentage of heathland/moorland individuals	%NM = 0
Number of wood-associated taxa	SL = 2
Number of wood-associated individuals	NL = 2
Percentage of wood-associated individuals	%NL = 1
Number of decomposer taxa	SRT = 31
Percentage of decomposer taxa	%SRT = 30
Number of decomposer individuals	NRT = 64
Percentage of decomposer individuals	%NRT = 35
Number of 'dry' decomposer taxa	SRD = 2
Percentage of 'dry' decomposer taxa	%SRD = 2
Number of 'dry' decomposer individuals	NRD = 4
Percentage of 'dry' decomposer individuals	%NRD = 2
Number of 'foul' decomposer taxa	SRF = 6
Percentage of 'foul' decomposer taxa	%SRF = 6
Number of 'foul' decomposer individuals	NRF = 13
Percentage of 'foul' decomposer individuals	%NRF = 7
Index of diversity of decomposer component	alpha RT = 24
Standard error	SE alpha RT = 5
Number of individuals of grain pests	NG = 0
Percentage of individuals of grain pests	%NG = 0
Number of individuals of grain pests	NG = 0

Number of uncoded taxa				SU = 18	Pterostichus oblongopunctatus (Fabricius)	1	1	33	oa
Percentage of uncoded individuals				PNU = 24	Agonum dorsale (Pontoppidan)	1	1	33	oa
					Amara sp.	1	1	33	oa
					?Harpalus sp.	1	1	33	oa
					Hygrotus sp.	1	1	33	oa w
					Helophorus aquaticus (Linnaeus)	1	1	33	oa w
					Sphaeridium ?bipustulatum Fabricius	1	1	33	rf
					Cercyon sp. A	1	1	33	u
					Megasternum obscurum (Marsham)	1	1	33	rt
					Hydrophilinae sp.	1	1	33	oa w
					Onthophilus striatus (Forster)	1	1	33	rt
					Acrotrichis sp.	1	1	33	rt
					Silpha sp.	1	1	33	u
					Micropeplus porcatus (Paykull)	1	1	33	rt
					Micropeplus staphylinoides (Marsham)	1	1	33	rt
					Lesteva heeri Fauvel	1	1	33	oa d
					Omalium ?rivulare (Paykull)	1	1	33	rt
					Omalium sp.	1	1	33	rt
					Platystethus arenarius (Fourcroy)	1	1	33	rf
					Platystethus cornutus group	1	1	33	oa d
					Lathrobium sp.	1	1	33	u
					Rugilus rufipes Germar	1	1	33	rt
					Xantholinus ?linearis (Olivier)	1	1	33	rt
					Tachinus sp.	1	1	33	u
					Falagria thoracica Stephens	1	1	33	rt
					Aleocharinae sp. A	1	1	33	u
					Aleocharinae sp. B	1	1	33	u
					Aleocharinae sp. G	1	1	33	u
					Aleocharinae sp. H	1	1	33	u
					Geotrupes sp.	1	1	33	oa rf
					Colobopterus haemorrhoidalis (Linnaeus)	1	1	33	oa rf
					Aphodius villosus Gyllenhal	1	1	33	oa p
					Oxyomus sylvestris (Scopoli)	1	1	33	rt
					Phyllopertha horticola (Linnaeus)	1	1	33	oa p
					Cyphon sp.	1	1	33	oa d
					?Dryops sp.	1	1	33	oa d
					Athous hirtus (Herbst)	1	1	33	oa p
					?Athous sp.	1	1	33	oa p
					?Selatosomus incanus (Gyllenhal)	1	1	33	oa
					Elateridae sp.	1	1	33	ob
					Melasis buprestoides (Linnaeus)	1	1	33	l
					Rhagonycha ?lignosa (Muller)	1	1	33	ob
					?Anobium sp.	1	1	33	l
					Atomaria sp. B	1	1	33	rd
					?Sericoderus lateralis (Gyllenhal)	1	1	33	rt
					Orthoperus sp.	1	1	33	rt
					Enicmus sp.	1	1	33	rt
					Lagria sp.	1	1	33	oa p
					Phyllotreta sp. A	1	1	33	oa p
					Phyllotreta sp. B	1	1	33	oa p
					Chrysomelidae sp.	1	1	33	oa p
					Apion (Ceratapion) onopordi Kirby	1	1	33	oa p
					Apion (Eutrichapion) minimum Herbst	1	1	33	oa p
					Phyllobius or Polydrusus sp.	1	1	33	oa p

Sitona humeralis Stephens	1	1	33	oa p
Ceutorhynchus erysimi (Fabricius)	1	1	33	oa p
Ceutorhynchus parvulus Brisout	1	1	33	oa p
Ceutorhynchus ?pollinarius (Forster)	1	1	33	oa p
Ceutorhynchus sp.	1	1	33	oa p
Coleoptera sp.	1	1	33	u

Percentage of 'foul' decomposer taxa	%SRF = 10
Number of 'foul' decomposer individuals	NRF = 6
Percentage of 'foul' decomposer individuals	%NRF = 11
Diversity index for RT not calculated, NRT = SRT or NRT < 20	
Number of individuals of grain pests	NG = 0
Percentage of individuals of grain pests	%NG = 0
Number of individuals of grain pests	NG = 0
Number of uncoded taxa	SU = 10
Percentage of uncoded individuals	PNU = 19

**Site: LEV92 Context: 370 Sample: 391/T - beetle/bug main statistics**

Erosion = 3 Fragmentation = 3; Weight = 1.000kg

Number of individuals estimated as	N = 54
Number of taxa	S = 48
Index of diversity (alpha)	alpha = 204
Standard error of alpha	SE alpha = 86
Number of 'certain' outdoor taxa	SOA = 22
Percentage of 'certain' outdoor taxa	%SOA = 46
Number of 'certain' outdoor individuals	NOA = 25
Percentage of 'certain' outdoor individuals	%NOA = 46
Number of 'certain' and probable outdoor taxa	SOB = 28
Percentage of 'certain' and probable outdoor taxa	%SOB = 58
Number of 'certain' and probable outdoor individuals	NOB = 32
Percentage 'certain' and probable outdoor individuals	%NOB = 59
Index of diversity of outdoor component	alpha OB = 104
Standard error	SE alpha OB = 53
Number of aquatic taxa	SW = 2
Percentage of aquatic taxa	%SW = 4
Number of aquatic individuals	NW = 4
Percentage of aquatic individuals	%NW = 7
Number of damp ground/waterside taxa	SD = 2
Percentage of damp ground/waterside taxa	%SD = 4
Number of damp ground/waterside individuals	ND = 3
Percentage of damp ground/waterside individuals	%ND = 6
Number of strongly plant-associated taxa	SP = 11
Percentage of strongly plant-associated taxa	%SP = 23
Number of strongly plant-associated individuals	NP = 12
Percentage of strongly plant-associated individuals	%NP = 22
Number of heathland/moorland taxa	SM = 0
Number of heathland/moorland individuals	NM = 0
Percentage of heathland/moorland individuals	%NM = 0
Number of wood-associated taxa	SL = 0
Number of wood-associated individuals	NL = 0
Percentage of wood-associated individuals	%NL = 0
Number of decomposer taxa	SRT = 14
Percentage of decomposer taxa	%SRT = 29
Number of decomposer individuals	NRT = 17
Percentage of decomposer individuals	%NRT = 31
Number of 'dry' decomposer taxa	SRD = 1
Percentage of 'dry' decomposer taxa	%SRD = 2
Number of 'dry' decomposer individuals	NRD = 1
Percentage of 'dry' decomposer individuals	%NRD = 2
Number of 'foul' decomposer taxa	SRF = 5

**Site: LEV92 Context: 370 Sample: 391/T - species list in rank order**

Taxon	n	%	R	Ecodes
Helophorus sp.	3	6	1	oa w
Anotylus nitidulus (Gravenhorst)	2	4	2	rt d
Anotylus sculpturatus group	2	4	2	rt
Aphodius sp. B	2	4	2	ob rf
Phyllopertha horticola (Linnaeus)	2	4	2	oa p
Scolopostethus sp.	1	2	6	oa p
Auchenorhyncha sp.	1	2	6	oa p
Pterostichus (Poecilus) sp.	1	2	6	oa
Pterostichus sp.	1	2	6	ob
Calathus sp.	1	2	6	oa
Harpalus sp.	1	2	6	oa
Metabletus sp.	1	2	6	oa
?Rhantus sp.	1	2	6	oa w
Cercyon ?haemorrhoidalis (Fabricius)	1	2	6	rf
Cercyon sp.	1	2	6	u
Megasternum obscurum (Marsham)	1	2	6	rt
Acrotrechis sp.	1	2	6	rt
Anisotomidae sp.	1	2	6	u
Silphidae sp.	1	2	6	u
Acidota cruentata Mannerheim	1	2	6	oa
Lesteva sp.	1	2	6	oa d
Omalium sp.	1	2	6	rt
Anotylus rugosus (Fabricius)	1	2	6	rt
Xantholinus linearis group	1	2	6	rt
Philonthus sp. A	1	2	6	u
Philonthus sp. B	1	2	6	u
Tachinus sp.	1	2	6	u
Aleocharinae sp. A	1	2	6	u
Aleocharinae sp. B	1	2	6	u
Aleocharinae sp. C	1	2	6	u
Aleocharinae sp. D	1	2	6	u
Geotrupes sp.	1	2	6	oa rf
Aphodius sp. A	1	2	6	ob rf
Aphodius sp. C	1	2	6	ob rf
?Agriotes sp.	1	2	6	oa p
Elateridae sp. A	1	2	6	ob
Elateridae sp. B	1	2	6	ob
Atomaria sp.	1	2	6	rd

Orthoperus sp.	1	2	6	rt
Phyllotreta sp.	1	2	6	oa p
Chaetocnema concinna (Marsham)	1	2	6	oa p
Apion (Ceratapion) sp.	1	2	6	oa p
Apion sp. A	1	2	6	oa p
Sitona sp. A	1	2	6	oa p
Sitona sp. B	1	2	6	oa p
Cidnorhinus quadrimaculatus (Linnaeus)	1	2	6	oa p
Curculionidae sp. A	1	2	6	oa
Curculionidae sp. B	1	2	6	oa

Site: LEV92; Context: 401; Sample: 727/T

NO RECORDS OF BEETLES OR BUGS

Site: LEV92 Context: 405 Sample: 498/TA - beetle/bug main statistics

Erosion = 3 Fragmentation = 3; Weight = 1.000kg

Number of individuals estimated as	N = 125
Number of taxa	S = 87
Index of diversity (alpha)	alpha = 126
Standard error of alpha	SE alpha = 23
Number of 'certain' outdoor taxa	SOA = 52
Percentage of 'certain' outdoor taxa	%SOA = 60
Number of 'certain' outdoor individuals	NOA = 84
Percentage of 'certain' outdoor individuals	%NOA = 67
Number of 'certain' and probable outdoor taxa	SOB = 58
Percentage of 'certain' and probable outdoor taxa	%SOB = 67
Number of 'certain' and probable outdoor individuals	NOB = 90
Percentage 'certain' and probable outdoor individuals	%NOB = 72
Index of diversity of outdoor component	alpha OB = 70
Standard error	SE alpha OB = 14
Number of aquatic taxa	SW = 18
Percentage of aquatic taxa	%SW = 21
Number of aquatic individuals	NW = 42
Percentage of aquatic individuals	%NW = 34
Number of damp ground/waterside taxa	SD = 7
Percentage of damp ground/waterside taxa	%SD = 8
Number of damp ground/waterside individuals	ND = 12
Percentage of damp ground/waterside individuals	%ND = 10
Number of strongly plant-associated taxa	SP = 21
Percentage of strongly plant-associated taxa	%SP = 24
Number of strongly plant-associated individuals	NP = 31
Percentage of strongly plant-associated individuals	%NP = 25
Number of heathland/moorland taxa	SM = 0
Number of heathland/moorland individuals	NM = 0
Percentage of heathland/moorland individuals	%NM = 0
Number of wood-associated taxa	SL = 0
Number of wood-associated individuals	NL = 0
Percentage of wood-associated individuals	%NL = 0
Number of decomposer taxa	SRT = 17

Percentage of decomposer taxa	%SRT = 20
Number of decomposer individuals	NRT = 21
Percentage of decomposer individuals	%NRT = 17
Number of 'dry' decomposer taxa	SRD = 2
Percentage of 'dry' decomposer taxa	%SRD = 2
Number of 'dry' decomposer individuals	NRD = 3
Percentage of 'dry' decomposer individuals	%NRD = 2
Number of 'foul' decomposer taxa	SRF = 2
Percentage of 'foul' decomposer taxa	%SRF = 2
Number of 'foul' decomposer individuals	NRF = 2
Percentage of 'foul' decomposer individuals	%NRF = 2
Index of diversity of decomposer component	alpha RT = 43
Standard error	SE alpha RT = 25
Number of individuals of grain pests	NG = 0
Percentage of individuals of grain pests	%NG = 0
Number of individuals of grain pests	NG = 0
Number of uncoded taxa	SU = 14
Percentage of uncoded individuals	PNU = 13

Site: LEV92 Context: 405 Sample: 498/TA - species list in rank order

Taxon	n	%	R	Ecodes
Tanysphyrus lemnae (Paykull)	9	7	1	oa w p
Helophorus sp. A	8	6	2	oa w
Ochthebius minimus (Fabricius)	7	6	3	oa w
Trechus obtusus or quadristriatus	3	2	4	oa
Lesteva longolytrata (Goeze)	3	2	4	oa d
Bembidion ?biguttatum (Fabricius)	2	2	6	oa d
Hydroporinae sp.	2	2	6	oa w
Megasternum obscurum (Marsham)	2	2	6	rt
Hydrobius fuscipes (Linnaeus)	2	2	6	oa w
?Laccobius sp.	2	2	6	oa w
Anotylus nitidulus (Gravenhorst)	2	2	6	rt d
Anotylus rugosus (Fabricius)	2	2	6	rt
Xantholinus sp.	2	2	6	u
Aleocharinae sp. B	2	2	6	u
Cyphon sp.	2	2	6	oa d
Atomaria sp. B	2	2	6	rd
Halticinae sp.	2	2	6	oa p
Phyllobius or Polydrusus sp.	2	2	6	oa p
Hydroporus dorsalis (Fabricius)	1	1	19	oa w
Pentatomidae sp.	1	1	19	oa p
Drymus ?brunneus (Sahlberg)	1	1	19	oa p
Scolopostethus sp.	1	1	19	oa p
Heteroptera sp.	1	1	19	u
Philaenus or Neophilaenus sp.	1	1	19	oa p
Macropsis sp.	1	1	19	oa p
Aphrodes flavostriatus (Donovan)	1	1	19	oa p d
Auchenorhyncha sp. A	1	1	19	oa p
Auchenorhyncha sp. B	1	1	19	oa p
Auchenorhyncha sp. C	1	1	19	oa p

Loricera pilicornis (Fabricius)	1	1	19	oa
Bembidion lampros or properans	1	1	19	oa
Bembidion ?gilvipes Sturm	1	1	19	oa d
Pterostichus sp.	1	1	19	ob
Calathus melanocephalus (Linnaeus)	1	1	19	oa
Amara sp.	1	1	19	oa
?Harpalus sp.	1	1	19	oa
Carabidae sp. A	1	1	19	ob
Carabidae sp. B	1	1	19	ob
Hydroporus sp.	1	1	19	oa w
Potamonectes depressus elegans (Panzer)	1	1	19	oa w
Agabus bipustulatus or striolatus (Linnaeus)	1	1	19	oa w
Agabus or Ilybius sp. A	1	1	19	oa w
Agabus or Ilybius sp. B	1	1	19	oa w
Agabus or Ilybius sp. C	1	1	19	oa w
Colymbetinae sp.	1	1	19	oa w
Helophorus nubilus Fabricius	1	1	19	oa
Helophorus sp. B	1	1	19	oa w
Hydraena brittini or rufipes	1	1	19	oa w
Hydraena testacea Curtis	1	1	19	oa w
Limnebius sp.	1	1	19	oa w
Leiodidae sp.	1	1	19	u
Silphidae sp.	1	1	19	u
Micropeplus sp.	1	1	19	rt
Anthobium ?atrocephalum (Gyllenhal)	1	1	19	oa
Omalium ?rivulare (Paykull)	1	1	19	rt
Omalium sp.	1	1	19	rt
Omalinae sp.	1	1	19	u
Carpelimus bilineatus Stephens	1	1	19	rt
Carpelimus rivularis (Motschulsky)	1	1	19	ob d
Carpelimus sp.	1	1	19	u
Oxytelus sculptus Gravenhorst	1	1	19	rt
Stenus sp.	1	1	19	u
Othius punctulatus (Goeze)	1	1	19	rt
Cordalia obscura (Gravenhorst)	1	1	19	rt
Drusilla canaliculata (Fabricius)	1	1	19	u
Aleocharinae sp. A	1	1	19	u
Aleocharinae sp. C	1	1	19	u
?Scarabaeidae sp.	1	1	19	u
Aphodius contaminatus (Herbst)	1	1	19	oa rf
Aphodius sp.	1	1	19	ob rf
Phyllopertha horticola (Linnaeus)	1	1	19	oa p
?Athous sp.	1	1	19	oa p
?Agriotes sp.	1	1	19	oa p
?Cantharidae sp.	1	1	19	ob
Nitidulidae sp.	1	1	19	u
Atomaria sp. A	1	1	19	rd
Phalacridae sp.	1	1	19	oa p
Orthoperus sp.	1	1	19	rt
Enicmus sp.	1	1	19	rt
?Corticarina sp.	1	1	19	rt
Chrysolina or Chrysomela sp.	1	1	19	oa p
Longitarsus sp.	1	1	19	oa p
?Chaetocnema sp.	1	1	19	oa p

Apion sp.	1	1	19	oa p
Ceutorhynchus floralis (Paykull)	1	1	19	oa p
Curculionidae sp.	1	1	19	oa
Coleoptera sp.	1	1	19	u

Site: LEV92; Context: 436; Sample: 782/T

NO RECORDS OF BEETLES OR BUGS

Site: LEV92; Context: 455; Sample: 491/T

NO RECORDS OF BEETLES OR BUGS

Site: LEV92; Context: 458; Sample: 459/T

NO RECORDS OF BEETLES OR BUGS

Site: LEV92; Context: 493; Sample: 497/T

NO RECORDS OF BEETLES OR BUGS

Site: LEV92; Context: 541; Sample: 546/T

NO RECORDS OF BEETLES OR BUGS

Site: LEV92; Context: 544; Sample: 566/T

NO RECORDS OF BEETLES OR BUGS

Site: LEV92; Context: 567; Sample: 569/T

NO RECORDS OF BEETLES OR BUGS

Site: LEV92 Context: 639 Sample: 645/T - beetle/bug main statistics

Erosion = 0 Fragmentation = 0; Weight = 1.000kg

Number of individuals estimated as N = 3

Number of taxa S = 3

Site: LEV92 Context: 639 Sample: 645/T - species list in rank order

Taxon	n	%	R	Ecodes
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Curculionidae sp.	1	33	1	oa
Coleoptera sp. A	1	33	1	u
Coleoptera sp. B	1	33	1	u

**Site: LEV92; Context: 712; Sample: 726/T**

NO RECORDS OF BEETLES OR BUGS

**Site: LEV92 Context: 716 Sample: 725/TA - beetle/bug main statistics**

Erosion = 2 Fragmentation = 3; Weight = 1.000kg

**Site: LEV92 Context: 680 Sample: 682/T1 - beetle/bug main statistics**

Erosion = 0 Fragmentation = 0; Weight = 1.000kg

Number of individuals estimated as N = 4  
 Number of taxa S = 4

Number of individuals estimated as	N = 104
Number of taxa	S = 79
Index of diversity (alpha)	alpha = 149
Standard error of alpha	SE alpha = 33
Number of 'certain' outdoor taxa	SOA = 44
Percentage of 'certain' outdoor taxa	%SOA = 56
Number of 'certain' outdoor individuals	NOA = 55
Percentage of 'certain' outdoor individuals	%NOA = 53
Number of 'certain' and probable outdoor taxa	SOB = 49
Percentage of 'certain' and probable outdoor taxa	%SOB = 62
Number of 'certain' and probable outdoor individuals	NOB = 65
Percentage 'certain' and probable outdoor individuals	%NOB = 63
Index of diversity of outdoor component	alpha OB = 90
Standard error	SE alpha OB = 25
Number of aquatic taxa	SW = 7
Percentage of aquatic taxa	%SW = 9
Number of aquatic individuals	NW = 11
Percentage of aquatic individuals	%NW = 11
Number of damp ground/waterside taxa	SD = 10
Percentage of damp ground/waterside taxa	%SD = 13
Number of damp ground/waterside individuals	ND = 14
Percentage of damp ground/waterside individuals	%ND = 13
Number of strongly plant-associated taxa	SP = 22
Percentage of strongly plant-associated taxa	%SP = 28
Number of strongly plant-associated individuals	NP = 28
Percentage of strongly plant-associated individuals	%NP = 27
Number of heathland/moorland taxa	SM = 0
Number of heathland/moorland individuals	NM = 0
Percentage of heathland/moorland individuals	%NM = 0
Number of wood-associated taxa	SL = 0
Number of wood-associated individuals	NL = 0
Percentage of wood-associated individuals	%NL = 0
Number of decomposer taxa	SRT = 16
Percentage of decomposer taxa	%SRT = 20
Number of decomposer individuals	NRT = 28
Percentage of decomposer individuals	%NRT = 27
Number of 'dry' decomposer taxa	SRD = 1
Percentage of 'dry' decomposer taxa	%SRD = 1
Number of 'dry' decomposer individuals	NRD = 1
Percentage of 'dry' decomposer individuals	%NRD = 1
Number of 'foul' decomposer taxa	SRF = 5
Percentage of 'foul' decomposer taxa	%SRF = 6
Number of 'foul' decomposer individuals	NRF = 12
Percentage of 'foul' decomposer individuals	%NRF = 12

**Site: LEV92 Context: 680 Sample: 682/T1 - species list in rank order**

Taxon	n	%	R	Ecodes
Hydroporinae sp.	1	25	1	oa w
Platystethus nitens (Sahlberg)	1	25	1	oa d
Byrrhidae sp.	1	25	1	oa p
Curculionidae sp.	1	25	1	oa

**Site: LEV92; Context: 696; Sample: 697/TA**

NO RECORDS OF BEETLES OR BUGS

Index of diversity of decomposer component	alpha RT = 16	Hydrobius fuscipes (Linnaeus)	1	1	18	oa w
Standard error	SE alpha RT = 5	Ochthebius sp.	1	1	18	oa w
Number of individuals of grain pests	NG = 0	Nargus velox (Spence)	1	1	18	u
Percentage of individuals of grain pests	%NG = 0	Silpha atrata Linnaeus	1	1	18	u
Number of individuals of grain pests	NG = 0	Anthobium sp.	1	1	18	oa
Number of uncoded taxa	SU = 17	Lesteva longolytrata (Goeze)	1	1	18	oa d
Percentage of uncoded individuals	PNU = 18	Lesteva sp.	1	1	18	oa d

**Site: LEV92 Context: 716 Sample: 725/TA - species list in rank order**

Taxon	n	%	R	Ecodes					
Aphodius sp. B	5	5	1	ob rf	Philonthus sp. A	1	1	18	u
Tanysphyrus lemnae (Paykull)	4	4	2	oa w p	Philonthus sp. B	1	1	18	u
Trechus obtusus or quadristriatus	3	3	3	oa	Staphylininae sp.	1	1	18	u
Platystethus arenarius (Fourcroy)	3	3	3	rf	Mycetoporus sp.	1	1	18	u
Anotylus nitidulus (Gravenhorst)	3	3	3	rt d	Tachyporus solutus Erichson	1	1	18	u
Anthocoris sp.	2	2	6	oa p	Tachinus sp.	1	1	18	u
Helophorus sp.	2	2	6	oa w	Falagria or Cordalia sp.	1	1	18	rt
Platystethus nitens (Sahlberg)	2	2	6	oa d	Aleocharinae sp. A	1	1	18	u
Platystethus nodifrons (Mannerheim)	2	2	6	oa d	Aleocharinae sp. C	1	1	18	u
Anotylus rugosus (Fabricius)	2	2	6	rt	Aleocharinae sp. D	1	1	18	u
Stenus sp. A	2	2	6	u	?Pselaphidae sp.	1	1	18	u
Gyrophypnus ?angustus Stephens	2	2	6	rt	Aphodius sp. A	1	1	18	ob rf
Aleocharinae sp. B	2	2	6	u	Phyllopertha horticola (Linnaeus)	1	1	18	oa p
Aphodius sp. C	2	2	6	ob rf	?Cyphon sp.	1	1	18	oa d
Oxyomus sylvestris (Scopoli)	2	2	6	rt	Athous sp.	1	1	18	oa p
Brachypterus sp.	2	2	6	oa p	Agriotes obscurus (Linnaeus)	1	1	18	oa p
Gastrophysa viridula (Degeer)	2	2	6	oa p	Cantharis sp.	1	1	18	ob
Drymus sp.	1	1	18	oa p	Atomaria sp.	1	1	18	rd
Scolopostethus sp.	1	1	18	oa p	Orthoperus sp.	1	1	18	rt
Lygaeidae sp.	1	1	18	oa p	?Corticaria sp.	1	1	18	rt
Miridae sp. A	1	1	18	oa p	?Chrysolina sp.	1	1	18	oa p
Miridae sp. B	1	1	18	oa p	Phaedon sp.	1	1	18	oa p
Aphrodes flavostriatus (Donovan)	1	1	18	oa p d	Prasocuris phellandrii (Linnaeus)	1	1	18	oa p d
Auchenorhyncha sp. A	1	1	18	oa p	Halticinae sp.	1	1	18	oa p
Auchenorhyncha sp. B	1	1	18	oa p	Ceutorhynchus sp.	1	1	18	oa p
Auchenorhyncha sp. C	1	1	18	oa p	Ceuthorhynchinae sp.	1	1	18	oa p
Pterostichus nigrita (Paykull)	1	1	18	oa d	Curculionidae sp.	1	1	18	oa
Pterostichus vernalis (Panzer)	1	1	18	oa	Coleoptera sp.	1	1	18	u
Pterostichus sp.	1	1	18	ob					
Calathus ?ambiguus (Paykull)	1	1	18	oa					
Calathus fuscipes (Goeze)	1	1	18	oa					
Calathus ?melanocephalus (Linnaeus)	1	1	18	oa					
Harpalus sp.	1	1	18	oa					
?Hygrotus sp.	1	1	18	oa w					
Hydroporus sp.	1	1	18	oa w					
Hydroporinae sp.	1	1	18	oa w					
Helophorus ?nubilus Fabricius	1	1	18	oa					
Cercyon analis (Paykull)	1	1	18	rt					
Cercyon haemorrhoidalis (Fabricius)	1	1	18	rf					
Cercyon sp.	1	1	18	u					

**Site: LEV92; Context: 722; Sample: 723/T**

NO RECORDS OF BEETLES OR BUGS

*Table A5. List of samples and contexts examined from excavations on the Leven-Brandesburton by-pass, in order of phase and archaeological period.*

<b>Phase</b>	<b>Period</b>	<b>Context</b>	<b>Context type</b>	<b>Sample</b>
1	Neo	52	*Fill from pit 53	61
1	Neo	778	*Fill from pit 777	779
1	B/A	173	*Fill from Bronze Age pit 172	242
1	B/A	173	*Fill from Bronze Age pit 172	243
1	I/A	11	Upper fill from pit 10	12
1	I/A	11	Upper fill from pit 10	15
1	I/A	13	*Lower fill from pit 10	14
1	I/A	68	Burnt fill from gully 67	88
1	I/A	90	Lower fill from ditch 48	143
2	EC2	70	*Fill from pit 69	71
2	EC2	74	*Lower ashy fill from pit 72	78
2/3/4	R/B	405	Fill from ditch 404	498
3	?C3	202	Upper fill from ditch 201	270
3	?C3	202	Upper fill from ditch 201	271
3	?C3	290	Lower fill from ditch 201	288
3	?C3	351	*Fill from sump 350	352
3	?C3	716	Lower fill from ditch 715	725
3/4	C3-4	370	Fill from ditch 369	391
4	LC4	258	Fill from ditch 257	374
4	LC4	258	Fill from ditch 257	375
4	LC4	358	*Charcoal fill from pit 357	367
4	LC4	401	Fill from gully 400	727
6	LC4	337	Fill from depression 373	382
6	LC4	337	Fill from depression 373	383
6	LC4	337	Fill from depression 373	673
6	LC4	493	Burnt fill of pit 492	497
6	LC4	541	Charcoal fill of pit 540	546

6	LC4	544	Fill from construction slot 545	566
6	LC4	567	Fill from ditch 568	569
6	LC4	696	Lower fill from pit 646	697
7	LC4	43	Fill from ditch 42	107
7	LC4	47	Fill from ditch 46	108
7	LC4	97	Fill from ditch 96	112
7	LC4	317	Fill from ditch 316	318
7	LC4	317	Fill from ditch 316	319
7	LC4	336	Fill from ditch 335	430
7	LC4	336	Fill from ditch 335	442
7	LC4	345	Fill from boundary ditch 344	638
7	LC4	436	Lower fill from pit 435	782
7	LC4	455	Burnt clay fill of pit 435	491
7	LC4	458	Layer 458	459
7	LC4	639	Charcoal fill from pit 640	645
7	LC4	712	Fill from pit 711	726
7	LC4	722	Charcoal fill from pit 721	723
?	R/B	680	Layer/fill over timbers 681	682