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MEDIEVAL AND POST-MEDIEVAL PLANT INVERTEBRATE REMAINS FROM AREA IV, THE BEDERN (NORTH-EAST), YORK

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Summary

Samples from 20 contexts from medieval and post-medieval deposits from Area IV of excavations at The Bedern (north-east), York, associated with the College of the Vicars Choral, attached to York Minster, were analysed for biological remains. Fifteen contexts were examined for insects via 18 samples, and the same number examined for plant remains via 17 samples. In addition, analyses of parasitic worm eggs were carried out on many of the deposits. For the most part, preservation was poor and interpretative value limited. A few pit fills are shown to have contained faecal material (presumably of human origin), including plant foods. The insect faunas, where large enough, were mostly typical of deposits of this period in York and overall the biota - or lack of it - indicates rather clean living conditions. The records will be useful in contributing to an overview of later medieval and post-medieval York.

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Investigation of medieval and post-medieval plant and invertebrate remains from Area IV of the excavations in The Bedern (north-east), York (YAT/Yorkshire Museum sitecode 1976-81.14 IV): Technical Report

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Introduction and methods

Deposits of medieval to early modern date were excavated from Area IV at The Bedern (north-east) during 1979-80. The sampling strategy for biological remains, although good by the standards of the time, was much less thorough than that currently favoured within the Environmental Archaeology Unit (Dobney *et al.* 1992), where all layers are sampled by means of a 'general biological analysis' sample, at least, with 'bulk-sieving' employed wherever practicable, together with 'site-riddling' where the context is very large. No bulk-sieving or site-riddling was undertaken for the present area. Samples for processing in the laboratory were prioritised by the post-excavation team and analyses undertaken sporadically through the period 1979-89.

Laboratory processing methods varied through the period of practical work. In the early stages, separate subsamples for insect and plant macrofossil analyses were taken; latterly, these remains were examined from the same subsamples. Initially, methods for extraction and recording of insect and plant remains followed those of Kenward *et al.* (1980). Latterly, the abbreviated 'test processing' method of Kenward *et al.* (1985) was employed for processing subsamples for both plant and insect analyses. The plant material from these subsamples was recorded semi-quantitatively; insects were fully quantitatively scan-recorded (Kenward 1992) unless otherwise stated. For each sample discussed below, the weight of the subsamples examined is given after the sample number. Invertebrates other than beetles and bugs (and worm eggs, see below) were not routinely recorded in a systematic way when the bulk of the analyses were carried out and, since it would be misleading to present the 'patchy' data obtained, this information is not included in this report. Recording of components of samples other than plant and invertebrate remains was likewise not wholly consistent, but lists of materials such as mortar, brick/tile, bone, shell and so on appear in Appendix 2 with the lists of plant remains.

Subsamples for analysis of the eggs of intestinal parasitic worms were treated following the 'modified Stoll method' summarised by Dainton (1992, 59-60); this work was supervised by Dr Andrew Jones. In addition, 'spot' samples were examined in various ways and some identifications of timbers were also made (included in Appendix 6).

This report is one of a series of three dealing with medieval and post-medieval plant and invertebrate analyses from excavations in The Bedern; Area X to the south-west and II, also to the north-east of The Bedern (site codes 1973-81.13 X and 1976-81.14 II) are considered by Hall *et al.* (1992a; b). The present report draws on an unpublished account by Kenward and Robertson (1988a). Other published information about plant and animal remains from this area of York is given by Kenward *et al.* (1986) who deal with Roman and early medieval material from The Bedern, south-west, Areas III-VI (1973-81.13 III-IV) and north-east, Area I (1976-81.14 I), and from a site adjacent to 1-5 Aldwark (1976-9.15). An unpublished report on post-Roman material from the last of these sites is given by Kenward and Robertson (1988b). Bone from Area II at The Bedern, south-west, is considered by O'Connor (1989a) and bone from various parts of this site by Scott (1985). Bone from Area X is considered further by Dobney (forthcoming). Further investigation of medieval deposits associated with standing buildings in this general part of York is reported by Jones (1989), Nicholson *et al.* (1989), O'Connor (1989b) and Robertson *et al.* (1989) dealing with material from a site in Coffee Yard (1987.1). Biological evidence from further sites, close to Coffee Yard, in Swinegate, will be investigated in the near future. The archaeological record pertinent to the deposits discussed in the present report is currently being drawn together by Dr Julian Richards, for York Archaeological Trust.

Results of the analyses

Species lists of plants and adult Coleoptera and other items recorded from the subsamples are given in Appendices 1-4. 'Main statistics' for the beetle and bug assemblages are given in Appendix 4. The presence of other groups of insects is noted in the text where relevant. Note that raw data for counts of parasite eggs are not presented in the appendices; the data have been drawn on in the text where they are presented semi-quantitatively on the following approximate scale: 'trace' — 1-3; 'few' — 4-7 *Trichuris* and 4-5 *Ascaris*; 'modest numbers' — 8-15 *Trichuris* and 6-10 *Ascaris*; 'significant numbers' — more than 15 *Trichuris* or 10 *Ascaris* ('large numbers' signifies several 10s of eggs counted). This scale has been adopted because (i) experience has shown that there is great heterogeneity in parasite egg concentrations in most deposits; (ii) it is inappropriate to use exact numbers where they lend spurious accuracy — they can only be converted to concentrations by multiplication, compounding inaccuracies inherent in the recording method; and (iii) in some cases the exact method used to extract and count eggs is not clear from the written archive. There were numerous records of structures provisionally identified as eggs of *Hymenolepis*, a nematode gut parasite of rodents. The determination is the subject of considerable uncertainty, however, and these records are referred to in the text as '*?Hymenolepis*'.

In the following account, the samples are considered by phase and context, with archaeological information in brackets after the context number. The sample number is, in some cases, followed by an indication of the number, size and kinds of subsample examined; thus, /1, /2 etc. refer to 'fully-processed' subsamples primarily investigated for insects; /T to 'test processed' subsamples (examined for insects and usually also for plant macrofossils); and /M to subsamples analysed exclusively for plant remains.

Phase 1 [mid C13th]

Context **4493** [pit fill]

Sample 103 (1 kg /T)

(Sediment not described in laboratory.)

The subsample examined produced a large flot which contained abundant plant remains, many seeds and a small and undistinguished insect assemblage (N = 40; S = 28) of generalized medieval character.

Quite a large assemblage of identifiable plant macrofossil taxa was recorded from the residue for this subsample, most of them weeds (with fat-hen, *Chenopodium album*, being the only taxon present in more than trace amounts). Although a trace of faecal concretion was recorded in the residue, of the plants recorded only fig, *Ficus carica*, and perhaps also elderberry, *Sambucus nigra*, could be counted as food plants. There was evidently a wide range of other material in the pit fill, since brick/tile, bone, eggshell, charcoal, limestone, pottery and wood were all noted as present in small amounts.

Two subsamples were examined for parasite eggs; one gave small numbers of '*?Hymenolepis*', the other a single *Ascaris*.

Phase 5 [early C14th]

Context **4016** [drain fill]

Sample 98 (1 kg /T)

Light to mid yellow-grey, moist, crumbly, slightly clay sand.

The tiny flot was largely barren with only two beetle fragments present. The bulk of the residue consisted of sand, with rather frequent snail shells, but otherwise only a small assemblage of identifiable plant remains, probably mostly weeds likely to have grown in the vicinity. There were traces of a wide range of other materials such as eggshell, fish bone and scale, mammal and bird bone, mussel shell and a rare record (one of only two for the medieval deposits from Areas II and IV (north-east) and X (south-west) at The Bedern) of ostracods, indicating the presence of standing water or of the incorporation of fresh water into the fill—perhaps not surprising in a drain.

Two subsamples were examined for parasite eggs; one was barren, the other gave a trace of *Ascaris*.

Phase 7 [late C14th-early C15th]

Context **4073** [floor]

Sample 5 (1 kg /T)

Mid grey-brown, dry, crumbly, sandy silt with moderate amounts of mortar.

The flot included a few plant remains and charcoal fragments. There were single individuals of eight beetle taxa, two of which were aquatics and the remainder typical decomposers for the present site.

Only two identifiable plant taxa were recorded from this subsample, one of them greater celandine, *Chelidonium majus*, a species typically found growing under walls (and recorded from a single context of the same phase from Area II and from four other contexts in Area IV, two of them also Phase 7). The major consistent of the residue was sand, with moderate amounts of coal and a small range of other occupation debris such as bone, charcoal and shellfish.

Two subsamples were examined for parasite eggs; both gave small numbers of *Trichuris* and a trace of *Ascaris*.

Context **4082** [floor]

Sample 6 (1 kg /T)

Light brown dry crumbly sandy silt with a small amount of mortar.

The tiny flot contained charcoal, small seeds, sand and a very few plant fragments. Single specimens of four beetles were also present. There were three identifiable plant taxa in this subsample, one of them a freshwater green alga (*Nitella/Tolypella*), most likely to have arrived in water brought to the site. Sand was abundant in the residue and there were small amounts of other occupation debris.

A single subsample was examined for parasite eggs; it was barren.

Context **4102** [floor]

Sample 14 (1 kg /T)

Mid to dark grey-brown dry to moist, crumbly, slightly sandy clay silt with small quantities of charcoal, ash and limestone.

A few fragments of plant and charcoal and one beetle, Pselaphidae sp., made up the tiny flot.

The residue was unusual in yielding rather large numbers of greater celandine seeds (see above, sample 5, from another floor in this phase). The other six taxa included fig, cotton-grass (*Eriophorum vaginatum*) and four plants likely to have been weeds; they do not form an interpretable assemblage. Small amounts of the usual range of bone, stone, pot and shell made up the residue.

Two subsamples were examined for parasite eggs; both gave a trace of *Trichuris*.

Context **4131** [fill]

Sample 15 (1 kg /T)

Mid greenish- to grey-brown, moist, plastic, sandy silty clay with some limestone.

The small flot included much plant material and charcoal and single individuals of two beetle taxa. There was only a trace of elderberry in the residue with a limited range of occupation debris, all in small amounts.

A single subsample was examined for parasite eggs; it was barren.

Context **4227** [floor]

Sample 17

Two subsamples were examined for parasite eggs; one was barren, the other gave a single '*?Hymenolepis*'.

Context **4345** [pit fill]

Sample 21 (1 kg /T)

Dark grey-brown to mid reddish-brown sandy clay to sandy clay silt, dry to moist, and crumbly, with patches of yellow and black, ash in abundance and burnt soil.

The tiny flot contained a few plant and charcoal fragments and three beetle taxa. This sample gave the third of the three records for greater celandine for this phase of the accumulations, together with elderberry, but otherwise the residue comprised moderate amounts of sand and mortar (the former probably largely derived from the latter) and charcoal, with bone, fish scale, eggshell and so on.

Two subsamples were examined for parasite eggs; one was barren, the other gave a single *Trichuris*.

Phase 8 [mid C15th-early C17th]

Context **4046** [?stake-hole fill]

Sample 3

Two subsamples were examined for parasite eggs; one was barren, the other gave a single *Trichuris*.

Context **4047** [pit fill]

Sample 1 (1 kg /T)

Grey-brown, dry, sandy silt with ash.

The subsample produced an entirely barren flot.

In the residue, three identifiable plant taxa were noted, one of them fig. They, and the small range of other components, were all present in trace amounts.

Two subsamples were examined for parasite eggs; one was barren, the other gave a single *Trichuris*.

Sample 16 (1 kg /T)

Black, moist, slightly plastic, layered, amorphous organic silt.

The flot was large, including many plant fragments, several wasp and fly heads and an extensive, well preserved beetle assemblage. It was estimated that there were 95 individuals, and 53 taxa were recorded. Diversity was moderately high (alpha = 50, SE = 9), and the outdoor component moderate (%N OB = 13); other statistics were unremarkable. The woodworm, *Anobium punctatum*, was abundant, presumably from nearby structural timber, and other more abundant taxa were a mixture of decomposers and probable domestics.

It is strange that the two samples should and have such different concentrations of insects. Various mechanisms could be envisaged, but there is no evidence for any particular one.

Similarly, for the plant remains, there was an enormous difference in the numbers of taxa and individuals recorded from these two subsamples. That from sample 16 gave 43 taxa, one of the largest assemblages from the medieval deposits from The Bedern! There was clear evidence for faecal material in this deposits in the form of faecal concretions (of which there were traces), but more particularly from the moderate amounts of cereal (wheat/rye) 'bran' and corncockle (*Agrostemma githago*) seed fragments (likely to have been grain contaminants milled during flour-making). Other foodplants were limited to fig, blackberry (*Rubus fruticosus* agg.), strawberry (*Fragaria* cf. *vesca*), ?celery seed (cf. *Apium graveolens*) and elderberry, and there were a few charred barley (*Hordeum* sp(p).) and ?oat (cf. *Avena* sp(p).) grains, too. Much the most abundant component of the assemblage was the weed group, representing a wide variety of ruderal and segetal habitats. There was a small wetland component (but no more than is usually recorded from urban archaeological deposits) and, with the presence of *Sphagnum* leaves, perhaps also evidence for peatland.

Two subsamples were examined for parasite eggs; they both gave substantial numbers of *Trichuris* and modest numbers of *Ascaris* (one also gave a single '*?Hymenolepis*').

Context **4090** [pit fill]

Sample 7 (1 kg /T)

Mid to dark red-brown, dry, crumbly, very sandy slightly clay silt with moderate quantities of limestone, mortar and brick/tile.

The small flot contained many pale plant fragments, a few seeds, charcoal, and a small, poorly preserved insect assemblage. The comments made on Sample 13 apply here also.

The residue yielded only a trace of fig seed, though there were abundant faecal concretions with considerable amounts of sand and mammal bone. Mineralised earthworm egg capsules and fly puparia are consistent with the presence of a high concentration of mineral salts, and eggs of the intestinal gut parasite *Trichuris* were noted

during examination of a small fragment of the concreted faecal material. There was also a fragment of what may have been a dog coprolite.

Three subsamples were examined for parasite eggs; one (from the fragment of ?dog coprolite) was barren, one gave a trace of *Trichuris*, and the third a small number of *Trichuris* and a single *Ascaris*.

Sample 11

Two subsamples were examined for parasite eggs; one was barren, the other gave a trace of both *Trichuris* and '*?Hymenolepis*'.

Context **4098** [?]

Sample 8 (1 kg /T)

Mid to dark grey-brown, dry, crumbly, sandy ash of which this context was composed originated from a small area of charcoal surrounding a complete pot.

The subsample from sample 8 produced a tiny flot with a small amount of fragmented plant remains and charcoal, and single individuals of three beetle taxa, one of them tentatively identified as *Ptinus tectus*, perhaps a contaminant.

Faecal concretions were again abundant in this subsample, but there were also very large amounts of coal and coke. Only two identifiable plant taxa were noted: fig seeds and some mineralised seeds perhaps from sloe/plum stones. In this case, *Ascaris* eggs were noted in a small subsample of concretion examined during analysis of the residue, and mineralised fly puparia were again recorded.

Two subsamples were examined for parasite eggs; small numbers of *Trichuris* were recorded from both whilst one also gave a single *Ascaris* and the other a single '*?Hymenolepis*'.

Sample 10

Two subsamples were examined for parasite eggs; both gave quite large numbers of *Trichuris* and one also modest numbers of *Ascaris*, the other a single '*?Hymenolepis*'.

Sample 12 (1 kg /T)

The tiny flot included many plant and charcoal fragments and single individuals of four beetle species.

Three subsamples were examined for parasite eggs; together, they gave traces of *Trichuris* and '*?Hymenolepis*'.

Context **4100** [pit fill]

Sample 9 (1 kg /T)

Light to mid grey-brown, crumbly, moist, sandy silty clay with small quantities of limestone, charcoal and brick/tile.

The flot contained plant fragments and a small beetle assemblage. The only species present in any numbers was *Anobium punctatum*, recorded as 'several'. Seen in context, there is nothing unusual about this group.

Of the four plant taxa recorded from this subsample, three are likely to have been weeds growing in the area, with the fourth, fig, representing food waste, although no faecal material was noted and the other components of the residue were a small range of materials like charcoal, eggshell, fish bone and oyster shell, as well as plaster, mortar and brick/tile.

A single subsample was examined for parasite eggs; it gave a trace of *Trichuris* and '*?Hymenolepis*'.

Sample 13 (1 kg /T)

A few plant and fly fragments, small seeds, charcoal and a modest beetle assemblage made up the small flot. Beyond a general urban medieval character and dominance by 'dry' decomposers, it could not be interpreted.

Only the flot was examined for plant remains and two wetland taxa were all that could found: water-plantain (*Alisma* sp(p).) and toad-rush (*Juncus bufonius*); there were, however, *Daphnia* ephippia, suggestive of the presence of standing water or of incorporation of water from elsewhere into the fill.

Phase 9 [mid C17th onwards]

Context **4065** [?]

Sample 4 (1 kg /T)

Dark grey-brown, dry, crumbly, sandy silt.

The tiny flot included charcoal, slag, a few plant fragments, and a small, well-preserved assemblage of beetles. Beyond fitting into the general pattern seen in other samples in this group, these were unremarkable.

Four plant taxa were recorded from the residue, three of them probably from more or less wetland habitats; they are not interpretable [unless they are foot-brought things from a floor**]. The most abundant component of the residue was sand, with traces of a small range of other materials such as fish bone and scale, charcoal, and mortar.

A single subsample was examined for parasite eggs; it was barren.

Context **4340** [?]

Sample 18 (1 kg /T)

Light, slightly yellowish-grey, moist, crumbly, sandy clay silt.

A few plant fragments, charcoal, a fly head and three beetles were present in the tiny flot.

In the residue was further evidence for greater celandine (see above), with two other taxa probably growing locally and of no further interpretative value. The residue also contained moderate amounts of mortar, sand and snail shells with a modest range of other occupation debris.

A single subsample was examined for parasite eggs; it was barren.

Context **4341** [?]

Sample 95

A single subsample was examined for parasite eggs; it was barren.

Sample 96 (1 kg /T)

Light to mid grey-brown, moist, plastic, slightly sandy silty clay with small amounts of limestone, charcoal and brick/tile.

The tiny flot contained plant and charcoal fragments, a few seeds and single individuals of two beetles, both probably originating in a building.

Five identifiable plant taxa were recorded from the residue but they do not offer useful interpretative information. There was quite a wide range of other components, all present in small amounts, including amphibian bone, shellfish, fish bone and scale, eggshell, and metallic slag.

A single subsample was examined for parasite eggs; it was barren.

Context **4342** [?]

Sample 97 (1 kg /T)

Yellow-grey, moist, crumbly, sandy clay with a little mortar.

Plant fragments, seeds, charcoal and single individuals of two beetle taxa were present in the tiny flot. The residue yielded a trace of elderberry seeds and a completely typical mixture of other components with only limestone and mortar present in more than trace amounts.

A single subsample was examined for parasite eggs; it was barren.

Unphased

Context **4491** [?]

Sample 100

Four subsamples were examined for parasite eggs; between them they indicated the presence of traces of *Trichuris*, *Ascaris* and '*?Hymenolepis*'.

Discussion

The material was generally impoverished as far as biological remains are concerned. Where there was an insect fauna, it was of a character now regarded as quite typical of medieval and post-medieval deposits formed in city centres (the post-medieval samples gave barely any insects). This reflects the fairly clean, well-drained nature of the surfaces, and probably an understanding of the need to keep rubbish and ordure covered, or to bury it rapidly. As *some* insects were present it appears likely that input of corpses was low, rather than conditions being wholly inhospitable to preservation.

Plant remains were generally sparse, though some pit fills of Phase 8 gave some evidence for foodplants and the presence of parasite eggs indicates that some, at least, of this material was faecal in origin.

Although giving limited information, this study has provided data which are of considerable use in a wider context, when examining changes in time and space in York and elsewhere.

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Appendix 1. Complete list of plant taxa recorded from excavations of Area IV at The Bedern, north-east (1976-81.14 IV), in taxonomic order (following Tutin *et al.* (1964-80) for vascular plants and Smith (1978) for mosses). The parts recorded are given and this list may be used to interpret abbreviations against plant names in Appendix 2. All remains were preserved by waterlogging, unless mineralisation or charring is indicated explicitly or, in cases where more than one kind of preservation was recorded, by means of a + (mineralisation) or a * (charring). For cereals charring is assumed unless otherwise shown. Where securely identified taxa were recorded, tentative identifications of the same taxa are not listed separately.

Vascular Plants

Ficus carica L.	seed(s)
Urtica dioica L.	achene(s)
Urtica urens L.	achene(s)
Polygonum hydropiper L.	fruit(s)
Polygonum persicaria L.	fruit(s)
Polygonum lapathifolium L.	fruit(s)
Bilderdykia convolvulus (L.) Dumort.	fruit fragment(s)
Rumex sp(p).	fruit(s)
Rumex acetosella agg.	fruit(s)
Chenopodium polyspermum L.	seed(s)
Chenopodium album L.	seed(s)
Atriplex sp(p).	seed(s)
Montia fontana ssp. chondrosperma (Fenzl) Walters	seed(s)
Stellaria media (L.) Vill.	seed(s)
Stellaria cf. neglecta Weihe in Bluff & Fingerh.	seed(s)
Cerastium sp(p).	seed(s)
Spergula arvensis L.	seed(s)
Agrostemma githago L.	seed fragment(s)
Ranunculus Section Ranunculus	achene(s)
Ranunculus sceleratus L.	achene(s)
Ranunculus flammula L.	achene(s)
Papaver argemone L.	seed(s)
Chelidonium majus L.	seed(s)
Fumaria sp(p).	seed(s)
Brassica rapa L.	seed(s)
Reseda luteola L.	seed(s)
Rubus fruticosus agg.	seed(s)
Potentilla cf. reptans L.	achene(s)
Fragaria cf. vesca L.	achene(s)
cf. Prunus sp(p).	mineralised seed(s)
Anthriscus sylvestris (L.) Hoffm.	mericarp(s)
Aethusa cynapium L.	mericarp(s)
Conium maculatum L.	mericarp(s)
cf. Apium graveolens L.	mericarp(s)
cf. Calluna vulgaris (L.) Hull	charred root and/or twig fragment(s)
Menyanthes trifoliata L.	seed(s)
Labiatae	nutlet(s)
cf. Marrubium vulgare L.	nutlet(s)
Galeopsis Subgenus Galeopsis	nutlet(s)
Hyoscyamus niger L.	seed(s)
cf. Solanum sp(p).	seed(s)
Rhinanthus sp(p).	seed(s)
Sambucus cf. ebulus L.	seed(s)
Sambucus nigra L.	seed(s)

Anthemis cotula L.	achene(s)
Chrysanthemum segetum L.	achene(s)
Senecio sp(p).	achene(s)
Centaurea sp(p).	achene(s)
Hypochoeris sp(p).	achene(s)
Alisma sp(p).	carpel(s) and/or seed(s)
Juncus inflexus/effusus/conglomeratus	seed(s)
Juncus bufonius L.	seed(s)
cf. Poa annua L.	mineralised caryopsis/es
cf. Bromus sp(p).	charred caryopsis/es
Triticum aestivo-compactum	charred caryopsis/es
Triticum/Secale	waterlogged periderm fragments
Hordeum sp(p).	charred caryopsis/es
Avena sp(p).	charred caryopsis/es
cf. Avena sp(p).	charred caryopsis/es
Scirpus maritimus/lacustris	nutlet(s)
Eriophorum vaginatum L.	sclerenchyma spindles (from leaf sheaths)
cf. Eleocharis sp(p).	nutlet(s)
Eleocharis palustris *sensu lato*	nutlet(s)
Cladium mariscus (L.) Pohl	nutlet(s)
Carex sp(p).	nutlet(s)

Mosses

Sphagnum sp(p).	leaf/leaves

Algae

Characeae	oogonium/ia

Appendix 2. Lists of plant remains from excavations at The Bedern (North-East, 1976-81.14) Area IV in context and sample number order. Taxonomic order follows Tutin *et al.* (1964-80) for vascular plants and Smith (1978) for mosses. Abbreviations for parts recorded can be found in Appendix 1. For some samples, other components of the residues left after processing are listed but recording of this was not systematic throughout.

The semi-quantitative scale adopted has three points: 1 — one or a few individuals or fragments; 2 — modest numbers of individuals or fragments; 3 — abundant individuals or fragments.

Context 4016	Sample 98/T
Ranunculus sceleratus	1
cf. Marrubium vulgare	1
Hyoscyamus niger	1
cf. Solanum sp(p).	1
Sambucus nigra	1
barnacle shell fgts	1
bird bone	1
brick/tile	1
charcoal	1
eggshell fgts	1
fish bone	1
fish scale	1
mammal bone	1
mortar	1
mussel shell fgts	1
oolitic limestone	1
ostracods	1
sand	3
snails	2
stones	1

Context 4047	Sample 1/T
Ficus carica	1
cf. Calluna vulgaris (ch rt-tw fgts)	1
Carex sp(p).	1
brick/tile	1
burnt mammal bone	1
charcoal	1
mortar	1
pottery	1
stones	1

Context 4047	Sample 16/T
Ficus carica	1
Urtica dioica	1
Urtica urens	1
Polygonum hydropiper	1
Polygonum persicaria	1
Bilderdykia convolvulus (ff)	1
Rumex sp(p).	1
Rumex acetosella agg.	1
Chenopodium polyspermum	1
Chenopodium album	1
Atriplex sp(p).	1
Montia fontana ssp. chondrosperma	1
Stellaria media	1
Stellaria cf. neglecta	1
Cerastium sp(p).	1
Spergula arvensis	1
Agrostemma githago (sf)	2
Ranunculus Section Ranunculus	1
Ranunculus sceleratus	1
Chelidonium majus	1
Brassica rapa	1
Reseda luteola	1
Rubus fruticosus agg.	1
Fragaria cf. vesca	1
Anthriscus sylvestris	1
Conium maculatum	1
cf. Apium graveolens	1
cf. Calluna vulgaris (ch rt-tw fgts)	1
Menyanthes trifoliata	1
Hyoscyamus niger	1
Sambucus nigra	1
Anthemis cotula	1
Chrysanthemum segetum	1
Senecio sp(p).	1
Centaurea sp(p).	1
Hypochoeris sp(p).	1
cf. Poa annua (min)	1
Triticum/Secale ('bran' fgts)	2
Hordeum sp(p).	1
cf. Avena sp(p).	1
Scirpus maritimus/lacustris	1
Carex sp(p).	1
Sphagnum sp(p). (lvs)	1
brick/tile	1
charcoal	1
faecal concretions	1
fish bone	1
fly puparia	1
iron-rich slag	1
mammal bone	1
mortar	1
wood fgts	1

Context 4065	Sample 4/T
Rumex acetosella agg.	1
Juncus inflexus/effusus/conglomeratus	1
Juncus bufonius	1
cf. Eleocharis sp(p).	1
brick/tile	1
charcoal	1
coal	1
fish bone	1
fish scale	1
mammal bone	1
mortar	1
sand	3

Context 4073	Sample 5/T
Chelidonium majus	1
Juncus bufonius	1
bird bone	1
brick/tile	1
charcoal	1
coal	2
eggshell fgts	1
fish bone	1
fish scale	1
mammal bone	1
mortar	1
oyster shell fgts	1
sand	3

Context 4082	Sample 6/T
Papaver argemone	1
Juncus bufonius	1
Characeae	1
brick/tile	1
charcoal	1
coal	1
fish bone	1
fish scale	1
mammal bone	1
mortar	1
sand	3
small stones	1

continued...

Context 4090	Sample 7/T
Ficus carica	1
?dog coprolite	1
Trichuris (ova)	1
brick/tile	1
chalk	1
charcoal	1
coal	1
earthworm egg caps (min)	1
eggshell fgts	1
faecal concretions	3
fish bone	1
fly puparia (min)	1
limestone	1
mammal bone	2
mortar	1
sand	2

Context 4098	Sample 8/T
Ficus carica	1
cf. Prunus sp(p). (min s)	1
Ascaris (ova)	1
bird bone	1
brick/tile	1
chalk	1
charcoal	1
coal	3
coke	3
faecal concretions	3
fish bone	1
fly puparia (min)	1
magnesian limestone	1
mammal bone	1
mortar	1
oyster shell fgts	1

Context 4100	Sample 9/T
Ficus carica	1
Hyoscyamus niger	1
Sambucus nigra	1
Juncus bufonius	1
brick/tile	1
charcoal	1
coal	1
eggshell fgts	1
fish bone	1
fly puparia	1
mammal bone	1
mortar	1
oyster shell fgts	1
plaster	1

Context 4100	Sample 13/TF
Alisma sp(p).	1
Juncus bufonius	1
Daphnia (ephippia)	1
fly puparia	1

Context 4102	Sample 14/T
Ficus carica	1
Rumex acetosella agg.	1
Chelidonium majus	2
Aethusa cynapium	1
Hyoscyamus niger	1
Sambucus nigra	1
Eriophorum vaginatum (scl sp)	1
brick/tile	1
charcoal	1
eggshell fgts	1
fish bone	1
fish scale	1
magnesian limestone	1
mammal bone	1
pottery	1
stones	1

Context 4131	Sample 15/T
Sambucus nigra	1
brick/tile	1
charcoal	1
coal	1
fish bone	1
magnesian limestone	1
mammal bone	1
mortar	1
sand	1
stones	1

Context 4340	Sample 18/T
Chelidonium majus	1
cf. Marrubium vulgare	1
Sambucus nigra	1
bird bone	1
brick/tile	1
coal	1
eggshell fgts	1
fish bone	1
fish scale	1
green-glazed pottery	1
mammal bone	1
mortar	2
oolitic limestone	1
oyster shell fgts	1
sand	2
snails	2
stones	1

Context 4341	Sample 96/T
Papaver argemone	1
Labiatae	1
Sambucus nigra	1
cf. Bromus sp(p).	1
Triticum aestivo-compactum	1
amphibian bone	1
brick/tile	1
burnt mammal bone	1
chalk	1
charcoal	1
coal	1
eggshell fgts	1
fish bone	1
fish scale	1
limestone	1
magnesian limestone	1
mammal bone	1
metallic slag	1
micaceous sandstone	1
mortar	1
mussel shell fgts	1
oolitic limestone	1
oyster shell fgts	1
pottery	1
snails	1

Context 4342	Sample 97/T
Sambucus nigra	1
brick/tile	1
charcoal	1
coal	1
eggshell fgts	1
fish bone	1
fish scale	1
magnesian limestone	2
mortar	2
mussel shell fgts	1

continued...

oyster shell fgts	1
snails	1

Context 4345 Sample 21/T

Chelidonium majus	1
Sambucus nigra	1
?Cenococcum (sclerotia)	1
brick/tile	1
charcoal	2
coal	1
eggshell fgts	1
fish bone	1
fish scale	1
mammal bone	1
mortar	2
sand	2
stones	1

Context 4493 Sample 103/T

Ficus carica	1
Urtica dioica	1
Polygonum lapathifolium	1
Rumex sp(p).	1
Rumex acetosella agg.	1
Chenopodium album	2
Atriplex sp(p).	1
Agrostemma githago (sf)	1
Ranunculus Section Ranunculus	1
Ranunculus sceleratus	1
Ranunculus flammula	1
Fumaria sp(p).	1
Reseda luteola	1
Potentilla cf. reptans	1
Conium maculatum	1
Menyanthes trifoliata	1
Galeopsis Subgenus Galeopsis	1
Rhinanthus sp(p).	1
Sambucus cf. ebulus	1
Sambucus nigra	1
Juncus bufonius	1
Avena sp(p).	1
cf. Eriophorum vaginatum (scl sp)	1
Eleocharis palustris sl	1
Cladium mariscus	1
Carex sp(p).	1
Sphagnum sp(p). (lvs)	1
?Cenococcum (sclerotia)	1
?resin	1
bird bone	1
brick/tile	1
chalk	1
charcoal	1
eggshell fgts	1
faecal concretions	1
fish bone	1
fly puparia	1
magnesian limestone	1
mammal bone	1
mortar	1
nails	1
oolitic limestone	1
pot rim fgts	1
sandstone	1
wood fgts	1

Appendix 3. List of Coleoptera from The Bedern, north-east, Area IV (1976-81.14 IV). Nomenclature and order follow Kloet and Hincks 1964-77. Invertebrates other than Coleoptera and parasite eggs were not recorded systematically from this site so no list is presented.

Coleoptera

Patrobus ?atrorufus (Strom)
Trechus obtusus or quadristriatus
Trechus sp. indet.
Carabidae spp.
Hydroporinae sp.
Helophorus spp.
Cercyon analis (Paykull)
Cercyon atricapillus (Marsham)
Cercyon terminatus (Marsham)
Megasternum obscurum (Marsham)
Cryptopleurum minutum (Fabricius)
Histerinae sp.
Ochthebius sp.
Ptenidium sp.
Acrotrichis sp.
Catops sp.
Catopinae sp. indet.
Micropeplus fulvus Erichson
Megarthrus sp.
Lesteva sp.
Omalium caesum or italicum
Omalium rivulare (Paykull)
Phloeostiba plana (Paykull)
Xylodromus concinnus (Marsham)
Coprophilus striatulus (Fabricius)
Carpelimus elongatulus (Erichson)
Platystethus arenarius (Fourcroy)
Anotylus complanatus (Erichson)
Anotylus nitidulus (Gravenhorst)
Anotylus rugosus (Fabricius)
Anotylus tetracarinatus (Block)
Oxytelus sculptus Gravenhorst
Gyrohypnus sp.
Philonthus sp.
Quedius sp.
Staphylininae spp. indet.
Tachinus subterraneus (Linnaeus)
Aleochara sp.
Aleocharinae spp.
Pselaphidae sp.
Aphodius ?granarius (Linnaeus)
Attagenus pellio (Linnaeus)
Anobium punctatum (Degeer)
Ptilinus pectinicornis (Linnaeus)
Tipnus unicolor (Piller & Mitterpacher)
Ptinus fur (Linnaeus)
Ptinidae sp.
Lyctus linearis (Goeze)
Rhizophagus ?parallelocollis Gyllenhal
Monotoma longicollis (Gyllenhall)
Oryzaephilus surinamensis (Linnaeus)
Cryptophagus scutellatus Newman
Cryptophagus spp.
Atomaria nigripennis (Kugelann)
Atomaria spp.
Mycetaea hirta (Marsham)
Lathridius minutus group
Enicmus sp.
Corticarina or Cortinicara sp.
Aglenus brunneus (Gyllenhal)
?Tenebrio obscurus Fabricius
Phyllotreta nemorum group
Sitophilus granarius (Linnaeus)
Cidnorhinus quadrimaculatus (Linnaeus)
Curculionidae sp.
Scolytus ?scolytus (Fabricius)
Scolytus sp.
Coleoptera spp. indet.

Appendix 4. Data concerning remains of Coleoptera from excavations at The Bedern, north-east, Area IV (1976-81.14 IV). For each sample from which more than a 'minimum number' of nine individuals were recorded, 'main statistics' for the assemblage are followed by a complete species list in rank order. For assemblages of less than ten individuals only N and S and the species list are given.

Context: 4047 Sample: 1/T

NO RECORDS OF BEETLES OR BUGS

Context: 4065 Sample: 4/T - beetle/bug main statistics

Erosion = 2 Fragmentation = 2; Weight = 1.000kg

Number of individuals estimated as	N =	6
Number of taxa	S =	6

Context: 4065 Sample: 4/T - species list in rank order

Taxon	Number	%	Rank	Ecodes
Trechus sp.	1	17	1	ob
Carabidae sp.	1	17	1	ob
Anobium punctatum (Degeer)	1	17	1	l
Tipnus unicolor (Piller & Mitterpacher)	1	17	1	rd
Cryptophagus sp. L	1	17	1	rd
Atomaria nigripennis (Kugelann)	1	17	1	rd

Context: 4073 Sample: 5/T - beetle/bug main statistics

Erosion = 3 Fragmentation = 3; Weight = 1.000kg

Number of individuals estimated as	N =	8
Number of taxa	S =	8

Context: 4073 Sample: 5/T - species list in rank order

Taxon	Number	%	Rank	Ecodes
Helophorus sp.	1	13	1	oa w
Cercyon ?analis (Paykull)	1	13	1	rt
Lesteva sp.	1	13	1	oa d
Anobium punctatum (Degeer)	1	13	1	l
Tipnus unicolor (Piller & Mitterpacher)	1	13	1	rd
Cryptophagus sp.	1	13	1	rd
Atomaria nigripennis (Kugelann)	1	13	1	rd
Lathridius minutus group	1	13	1	rd

Context: 4082 Sample: 6/T - beetle/bug main statistics

Erosion = 5 Fragmentation = 5; Weight = 1.000kg

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

continued...

Context: 4082 Sample: 6/T - species list in rank order

Taxon	Number	%	Rank	Ecodes
Staphylininae sp.	1	25	1	u
Tipnus unicolor (Piller & Mitterpacher)	1	25	1	rd
Ptinus fur (Linnaeus)	1	25	1	rd
Lathridius minutus group	1	25	1	rd

Context: 4090 Sample: 7/T - beetle/bug main statistics

Erosion = 5 Fragmentation = 5; Weight = 1.000kg

Number of individuals estimated as	N =	12
Number of taxa	S =	7
Index of diversity not calculated, n = s or n < 20		
Number of 'certain' outdoor taxa	SOA =	0
Percentage of 'certain' outdoor taxa	%SOA =	0
Number of 'certain' outdoor individuals	NOA =	0
Percentage of 'certain' outdoor individuals	%NOA =	0
Number of 'certain' and probable outdoor taxa	SOB =	0
Percentage of 'certain' and probable outdoor taxa	%SOB =	0
Number of 'certain' and probable outdoor individuals	NOB =	0
Percentage 'certain' and probable outdoor individuals	%NOB =	0
Diversity index for OB not calculated, NOB = SOB or NOB < 20		
Number of aquatic taxa	SW =	0
Percentage of aquatic taxa	%SW =	0
Number of aquatic individuals	NW =	0
Percentage of aquatic individuals	%NW =	0
Number of damp ground/waterside taxa	SD =	0
Percentage of damp ground/waterside taxa	%SD =	0
Number of damp ground/waterside individuals	ND =	0
Percentage of damp ground/waterside individuals	%ND =	0
Number of strongly plant-associated taxa	SP =	0
Percentage of strongly plant-associated taxa	%SP =	0
Number of strongly plant-associated individuals	NP =	0
Percentage of strongly plant-associated individuals	%NP =	0
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 =	1
Number of wood-associated individuals	NL =	1
Percentage of wood-associated individuals	%NL =	8
Number of decomposer taxa	SRT =	3
Percentage of decomposer taxa	%SRT =	43
Number of decomposer individuals	NRT =	8
Percentage of decomposer individuals	%NRT =	67
Number of 'dry' decomposer taxa	SRD =	2
Percentage of 'dry'decomposer taxa	%SRD =	29
Number of 'dry' decomposer individuals	NRD =	7
Percentage of 'dry'decomposer individuals	%NRD =	58
Number of 'foul' decomposer taxa	SRF =	0
Percentage of 'foul' decomposer taxa	%SRF =	0
Number of 'foul' decomposer individuals	NRF =	0
Percentage of 'foul' decomposer individuals	%NRF =	0
Diversity index for RT not calculated, NRT = SRT or NRT < 20		
Number of individuals of grain pests	NG =	1
Percentage of individuals of grain pests	%NG =	8
Number of individuals of grain pests	NG =	1
Number of uncoded taxa	SU =	2
Percentage of uncoded individuals	PNU =	17

continued...

Context: 4090 Sample: 7/T - species list in rank order

NOTE: this list includes 'semi-quantitative' records, marked by '*' in the first column of the comment following a record.

Taxon	Number	%	Rank	Ecodes
Tipnus unicolor (Piller & Mitterpacher)*	6	50	1	rd
Catops sp.	1	8	2	u
Staphylininae sp.	1	8	2	u
Anobium punctatum (Degeer)	1	8	2	l
Oryzaephilus surinamensis (Linnaeus)	1	8	2	g
Atomaria sp.	1	8	2	rd
?Tenebrio obscurus Fabricius	1	8	2	rt

Context: 4098 Sample: 8/T - beetle/bug main statistics

Erosion = 3 Fragmentation = 3; Weight = 1.000kg

Number of individuals estimated as	N =	3
Number of taxa	S =	3

Context: 4098 Sample: 8/T - species list in rank order

Taxon	Number	%	Rank	Ecodes
Catops sp.	1	33	1	u
Anobium punctatum (Degeer)	1	33	1	l
?Ptinus tectus Boieldieu	1	33	1	rd

Context: 4100 Sample: 9/T - beetle/bug main statistics

Erosion = 3 Fragmentation = 2; Weight = 1.000kg

Number of individuals estimated as	N =	15
Number of taxa	S =	9
Index of diversity not calculated, n = s or n < 20		
Number of 'certain' outdoor taxa	SOA =	0
Percentage of 'certain' outdoor taxa	%SOA =	0
Number of 'certain' outdoor individuals	NOA =	0
Percentage of 'certain' outdoor individuals	%NOA =	0
Number of 'certain' and probable outdoor taxa	SOB =	0
Percentage of 'certain' and probable outdoor taxa	%SOB =	0
Number of 'certain' and probable outdoor individuals	NOB =	0
Percentage 'certain' and probable outdoor individuals	%NOB =	0
Diversity index for OB not calculated, NOB = SOB or NOB < 20		
Number of aquatic taxa	SW =	0
Percentage of aquatic taxa	%SW =	0
Number of aquatic individuals	NW =	0
Percentage of aquatic individuals	%NW =	0
Number of damp ground/waterside taxa	SD =	0
Percentage of damp ground/waterside taxa	%SD =	0
Number of damp ground/waterside individuals	ND =	0
Percentage of damp ground/waterside individuals	%ND =	0
Number of strongly plant-associated taxa	SP =	0
Percentage of strongly plant-associated taxa	%SP =	0
Number of strongly plant-associated individuals	NP =	0
Percentage of strongly plant-associated individuals	%NP =	0
Number of heathland/moorland taxa	SM =	0
Number of heathland/moorland individuals	NM =	0
Percentage of heathland/moorland individuals	%NM =	0

continued...

Number of wood-associated taxa	SL =	1
Number of wood-associated individuals	NL =	6
Percentage of wood-associated individuals	%NL =	40
Number of decomposer taxa	SRT =	4
Percentage of decomposer taxa	%SRT =	44
Number of decomposer individuals	NRT =	5
Percentage of decomposer individuals	%NRT =	33
Number of 'dry' decomposer taxa	SRD =	2
Percentage of 'dry'decomposer taxa	%SRD =	22
Number of 'dry' decomposer individuals	NRD =	3
Percentage of 'dry'decomposer individuals	%NRD =	20
Number of 'foul' decomposer taxa	SRF =	0
Percentage of 'foul' decomposer taxa	%SRF =	0
Number of 'foul' decomposer individuals	NRF =	0
Percentage of 'foul' decomposer individuals	%NRF =	0

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 =	4
Percentage of uncoded individuals	PNU =	27

Context: 4100 Sample: 9/T - species list in rank order

NOTE: this list includes 'semi-quantitative' records, marked by '*' in the first column of the comment following a record.

Taxon	Number	%	Rank	Ecodes
Anobium punctatum (Degeer)*	6	40	1	l
Lathridius minutus group	2	13	2	rd
Catops sp.	1	7	3	u
Staphylininae sp.	1	7	3	u
Aleocharinae sp.	1	7	3	u
Rhizophagus ?parallelocollis Gyllenhal	1	7	3	rt
Atomaria sp.	1	7	3	rd
Corticarina or Cortinicara sp.	1	7	3	rt
Coleoptera sp.	1	7	3	u

Context: 4098 Sample: 12/TB - beetle/bug main statistics

Erosion = 3 Fragmentation = 3; Weight = 1.000kg

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

Context: 4098 Sample: 12/TB - species list in rank order

Taxon	Number	%	Rank	Ecodes
Ptenidium sp.	1	25	1	rt
Catopinae sp.	1	25	1	u
Tipnus unicolor (Piller & Mitterpacher)	1	25	1	rd
Lathridius minutus group	1	25	1	rd

Context: 4100 Sample: 13/T - beetle/bug main statistics

Erosion = 4 Fragmentation = 3; Weight = 1.000kg

Number of individuals estimated as	N =	19

continued...

Number of taxa	S =	13
Index of diversity not calculated, n = s or n < 20		
Number of 'certain' outdoor taxa	SOA =	2
Percentage of 'certain' outdoor taxa	%SOA =	15
Number of 'certain' outdoor individuals	NOA =	2
Percentage of 'certain' outdoor individuals	%NOA =	11
Number of 'certain' and probable outdoor taxa	SOB =	3
Percentage of 'certain' and probable outdoor taxa	%SOB =	23
Number of 'certain' and probable outdoor individuals	NOB =	4
Percentage 'certain' and probable outdoor individuals	%NOB =	21
Diversity index for OB not calculated, NOB = SOB or NOB < 20		
Number of aquatic taxa	SW =	1
Percentage of aquatic taxa	%SW =	8
Number of aquatic individuals	NW =	1
Percentage of aquatic individuals	%NW =	5
Number of damp ground/waterside taxa	SD =	0
Percentage of damp ground/waterside taxa	%SD =	0
Number of damp ground/waterside individuals	ND =	0
Percentage of damp ground/waterside individuals	%ND =	0
Number of strongly plant-associated taxa	SP =	0
Percentage of strongly plant-associated taxa	%SP =	0
Number of strongly plant-associated individuals	NP =	0
Percentage of strongly plant-associated individuals	%NP =	0
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 =	8
Percentage of decomposer taxa	%SRT =	62
Number of decomposer individuals	NRT =	13
Percentage of decomposer individuals	%NRT =	68
Number of 'dry' decomposer taxa	SRD =	6
Percentage of 'dry'decomposer taxa	%SRD =	46
Number of 'dry' decomposer individuals	NRD =	9
Percentage of 'dry'decomposer individuals	%NRD =	47
Number of 'foul' decomposer taxa	SRF =	0
Percentage of 'foul' decomposer taxa	%SRF =	0
Number of 'foul' decomposer individuals	NRF =	0
Percentage of 'foul' decomposer individuals	%NRF =	0
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 =	2
Percentage of uncoded individuals	PNU =	11

Context: 4100 Sample: 13/T - species list in rank order

Taxon	Number	%	Rank	Ecodes
Lathridius minutus group	3	16	1	rd
Carabidae sp.	2	11	2	ob
Megasternum obscurum (Marsham)	2	11	2	rt
Omalium rivulare (Paykull)	2	11	2	rt
Tipnus unicolor (Piller & Mitterpacher)	2	11	2	rd
Ochthebius sp.	1	5	6	oa w
Staphylininae sp.	1	5	6	u
Aleocharinae sp.	1	5	6	u
Ptinidae sp.	1	5	6	rd
Cryptophagus sp.	1	5	6	rd
Atomaria nigripennis (Kugelann)	1	5	6	rd

continued...

Mycetaea hirta (Marsham)	1	5	6	rd
Curculionidae sp.	1	5	6	oa

Context: 4102 Sample: 14/T - beetle/bug main statistics

Erosion = 2 Fragmentation = 1; Weight = 1.000kg

Number of individuals estimated as	N =	1
Number of taxa	S =	1

Context: 4102 Sample: 14/T - species list in rank order

Taxon	Number	%	Rank	Ecodes
Pselaphidae sp.	1	100	1	u

Context: 4131 Sample: 15/T - beetle/bug main statistics

Erosion = 3 Fragmentation = 3; Weight = 1.000kg

Number of individuals estimated as	N =	2
Number of taxa	S =	2

Context: 4131 Sample: 15/T - species list in rank order

Taxon	Number	%	Rank	Ecodes
Catopinae sp.	1	50	1	u
Aleocharinae sp.	1	50	1	u

Context: 4047 Sample: 16/T - beetle/bug main statistics

Erosion = 2 Fragmentation = 2; Weight = 1.000kg

Number of individuals estimated as	N =	95
Number of taxa	S =	53
Index of diversity (alpha)	alpha =	50
Standard error of alpha	SE alpha =	9
Number of 'certain' outdoor taxa	SOA =	8
Percentage of 'certain' outdoor taxa	%SOA =	15
Number of 'certain' outdoor individuals	NOA =	10
Percentage of 'certain' outdoor individuals	%NOA =	11
Number of 'certain' and probable outdoor taxa	SOB =	10
Percentage of 'certain' and probable outdoor taxa	%SOB =	19
Number of 'certain' and probable outdoor individuals	NOB =	12
Percentage 'certain' and probable outdoor individuals	%NOB =	13
Diversity index for OB not calculated, NOB = SOB or NOB < 20		
Number of aquatic taxa	SW =	3
Percentage of aquatic taxa	%SW =	6
Number of aquatic individuals	NW =	3
Percentage of aquatic individuals	%NW =	3
Number of damp ground/waterside taxa	SD =	1
Percentage of damp ground/waterside taxa	%SD =	2
Number of damp ground/waterside individuals	ND =	1
Percentage of damp ground/waterside individuals	%ND =	1
Number of strongly plant-associated taxa	SP =	2
Percentage of strongly plant-associated taxa	%SP =	4
Number of strongly plant-associated individuals	NP =	4
Percentage of strongly plant-associated individuals	%NP =	4

continued...

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 =	4
Number of wood-associated individuals	NL =	18
Percentage of wood-associated individuals	%NL =	19
Number of decomposer taxa	SRT =	27
Percentage of decomposer taxa	%SRT =	51
Number of decomposer individuals	NRT =	48
Percentage of decomposer individuals	%NRT =	51
Number of 'dry' decomposer taxa	SRD =	8
Percentage of 'dry'decomposer taxa	%SRD =	15
Number of 'dry' decomposer individuals	NRD =	17
Percentage of 'dry'decomposer individuals	%NRD =	18
Number of 'foul' decomposer taxa	SRF =	4
Percentage of 'foul' decomposer taxa	%SRF =	8
Number of 'foul' decomposer individuals	NRF =	4
Percentage of 'foul' decomposer individuals	%NRF =	4
Index of diversity of decomposer component	alpha RT =	26
Standard error	SE alpha RT =	7
Number of individuals of grain pests	NG =	2
Percentage of individuals of grain pests	%NG =	2
Number of individuals of grain pests	NG =	2
Number of uncoded taxa	SU =	11
Percentage of uncoded individuals	PNU =	17

Context: 4047 Sample: 16/T - species list in rank order

NOTE: this list includes 'semi-quantitative' records, marked by '*' in the first column of the comment following a record.

Taxon	Number	%	Rank	Ecodes
Anobium punctatum (Degeer)*	15	16	1	l
Anotylus rugosus (Fabricius)*	6	6	2	rt
Ptinus ?fur (Linnaeus)*	6	6	2	rd
Cercyon analis (Paykull)	3	3	4	rt
Omalium ?rivulare (Paykull)	3	3	4	rt
Aleocharinae sp. A	3	3	4	u
Aleocharinae sp. C	3	3	4	u
Lathridius minutus group	3	3	4	rd
Ptenidium sp.	2	2	9	rt
Coprophilus striatulus (Fabricius)	2	2	9	rt
Gyrohypnus sp.	2	2	9	rt
Staphylininae sp. B	2	2	9	u
Tipnus unicolor (Piller & Mitterpacher)	2	2	9	rd
Atomaria ?nigripennis (Kugelann)	2	2	9	rd
Phyllotreta nemorum group	2	2	9	oa p
Cidnorhinus quadrimaculatus (Linnaeus)	2	2	9	oa p
Patrobus ?atrorufus (Strom)	1	1	17	oa
Trechus obtusus or quadristriatus	1	1	17	oa
Carabidae sp.	1	1	17	ob
Hydroporinae sp.	1	1	17	oa w
Helophorus sp. A	1	1	17	oa w
Helophorus sp. B	1	1	17	oa w
Cercyon atricapillus (Marsham)	1	1	17	rf
Cercyon terminatus (Marsham)	1	1	17	rf
Cryptopleurum minutum (Fabricius)	1	1	17	rf
Histerinae sp.	1	1	17	u
Acrotrichis sp.	1	1	17	rt
Catops sp.	1	1	17	u
Micropeplus fulvus Erichson	1	1	17	rt
Megarthrus sp.	1	1	17	rt

continued...

Omalium caesum or italicum	1	1	17	rt
Phloeostiba plana (Paykull)	1	1	17	l
Xylodromus concinnus (Marsham)	1	1	17	rt
Anotylus complanatus (Erichson)	1	1	17	rt
Anotylus nitidulus (Gravenhorst)	1	1	17	rt d
Anotylus tetracarinatus (Block)	1	1	17	rt
Philonthus sp.	1	1	17	u
Staphylininae sp. A	1	1	17	u
Tachinus subterraneus (Linnaeus)	1	1	17	u
Aleochara sp.	1	1	17	u
Aleocharinae sp. B	1	1	17	u
Aphodius ?granarius (Linnaeus)	1	1	17	ob rf
Ptilinus pectinicornis (Linnaeus)	1	1	17	l
Lyctus linearis (Goeze)	1	1	17	l
Oryzaephilus surinamensis (Linnaeus)	1	1	17	g
Cryptophagus sp. A	1	1	17	rd
Cryptophagus sp. R	1	1	17	rd
Atomaria sp.	1	1	17	rd
Mycetaea hirta (Marsham)	1	1	17	rd
Enicmus sp.	1	1	17	rt
Sitophilus granarius (Linnaeus)	1	1	17	g
Curculionidae sp.	1	1	17	oa
Coleoptera sp. B	1	1	17	u

Context: 4340 Sample: 18/T - beetle/bug main statistics

Erosion = 3 Fragmentation = 3; Weight = 1.000kg

Number of individuals estimated as	N =	3
Number of taxa	S =	3

Context: 4340 Sample: 18/T - species list in rank order

Taxon	Number	%	Rank	Ecodes
Quedius sp.	1	33	1	u
Anobium punctatum (Degeer)	1	33	1	l
Scolytus sp.	1	33	1	l

Context: 4345 Sample: 21/T - beetle/bug main statistics

Erosion = 3 Fragmentation = 2; Weight = 1.000kg

Number of individuals estimated as	N =	3
Number of taxa	S =	3

Context: 4345 Sample: 21/T - species list in rank order

Taxon	Number	%	Rank	Ecodes
Cryptophagus sp.	1	33	1	rd
Coleoptera sp. A	1	33	1	u
Coleoptera sp. B	1	33	1	u

Context: 4341 Sample: 96/T - beetle/bug main statistics

Erosion = 3 Fragmentation = 2; Weight = 1.000kg

Number of individuals estimated as	N =	2
Number of taxa	S =	2

continued...

Context: 4341 Sample: 96/T - species list in rank order

Taxon	Number	%	Rank	Ecodes
Anobium punctatum (Degeer)	1	50	1	l
Tipnus unicolor (Piller & Mitterpacher)	1	50	1	rd

Context: 4342 Sample: 97/T - beetle/bug main statistics

Erosion = 3 Fragmentation = 1; Weight = 1.000kg

Number of individuals estimated as	N =	2
Number of taxa	S =	2

Context: 4342 Sample: 97/T - species list in rank order

Taxon	Number	%	Rank	Ecodes
Aleocharinae sp.	1	50	1	u
Lathridius minutus group	1	50	1	rd

Context: 4016 Sample: 98/T - beetle/bug main statistics

Erosion = 3 Fragmentation = 3; Weight = 1.000kg

Number of individuals estimated as	N =	1
Number of taxa	S =	1

Context: 4016 Sample: 98/T - species list in rank order

Taxon	Number	%	Rank	Ecodes
Coleoptera sp.	1	100	1	u

Context: 4493 Sample: 103/T - beetle/bug main statistics

Erosion = 3 Fragmentation = 3; Weight = 1.000kg

Number of individuals estimated as	N =	40
Number of taxa	S =	28
Index of diversity (alpha)	alpha =	42
Standard error of alpha	SE alpha =	14
Number of 'certain' outdoor taxa	SOA =	1
Percentage of 'certain' outdoor taxa	%SOA =	4
Number of 'certain' outdoor individuals	NOA =	1
Percentage of 'certain' outdoor individuals	%NOA =	3
Number of 'certain' and probable outdoor taxa	SOB =	3
Percentage of 'certain' and probable outdoor taxa	%SOB =	11
Number of 'certain' and probable outdoor individuals	NOB =	3
Percentage 'certain' and probable outdoor individuals	%NOB =	8
Diversity index for OB not calculated, NOB = SOB or NOB < 20		
Number of aquatic taxa	SW =	0
Percentage of aquatic taxa	%SW =	0
Number of aquatic individuals	NW =	0
Percentage of aquatic individuals	%NW =	0
Number of damp ground/waterside taxa	SD =	1
Percentage of damp ground/waterside taxa	%SD =	4
Number of damp ground/waterside individuals	ND =	1
Percentage of damp ground/waterside individuals	%ND =	3
Number of strongly plant-associated taxa	SP =	0

continued...

Percentage of strongly plant-associated taxa	%SP =	0
Number of strongly plant-associated individuals	NP =	0
Percentage of strongly plant-associated individuals	%NP =	0
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 =	4
Number of wood-associated individuals	NL =	9
Percentage of wood-associated individuals	%NL =	23
Number of decomposer taxa	SRT =	17
Percentage of decomposer taxa	%SRT =	61
Number of decomposer individuals	NRT =	23
Percentage of decomposer individuals	%NRT =	58
Number of 'dry' decomposer taxa	SRD =	8
Percentage of 'dry'decomposer taxa	%SRD =	29
Number of 'dry' decomposer individuals	NRD =	8
Percentage of 'dry'decomposer individuals	%NRD =	20
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 =	3
Index of diversity of decomposer component	alpha RT =	30
Standard error	SE alpha RT =	14
Number of individuals of grain pests	NG =	1
Percentage of individuals of grain pests	%NG =	3
Number of individuals of grain pests	NG =	1
Number of uncoded taxa	SU =	3
Percentage of uncoded individuals	PNU =	10

Context: 4493 Sample: 103/T - species list in rank order

NOTE: this list includes 'semi-quantitative' records, marked by '*' in the first column of the comment following a record.

Taxon	Number	%	Rank	Ecodes
Xylodromus concinnus (Marsham)*	6	15	1	rt
Anobium punctatum (Degeer)*	6	15	1	l
Oxytelus sculptus Gravenhorst	2	5	3	rt
Aleocharinae sp. A	2	5	3	u
Carabidae sp. A	1	3	5	ob
Carabidae sp. B	1	3	5	ob
Cercyon analis (Paykull)	1	3	5	rt
Ptenidium sp.	1	3	5	rt
Carpelimus elongatulus (Erichson)	1	3	5	oa d
Platystethus arenarius (Fourcroy)	1	3	5	rf
Anotylus complanatus (Erichson)	1	3	5	rt
Anotylus rugosus (Fabricius)	1	3	5	rt
Philonthus sp.	1	3	5	u
Aleocharinae sp. B	1	3	5	u
Attagenus pellio (Linnaeus)	1	3	5	rd
Tipnus unicolor (Piller & Mitterpacher)	1	3	5	rd
Ptinus fur (Linnaeus)	1	3	5	rd
Lyctus linearis (Goeze)	1	3	5	l
Monotoma longicollis (Gyllenhall)	1	3	5	rt
Cryptophagus scutellatus Newman	1	3	5	rd
Cryptophagus sp. A	1	3	5	rd
Cryptophagus sp. B	1	3	5	rd
Atomaria sp. A	1	3	5	rd
Atomaria sp. B	1	3	5	rd
Aglenus brunneus (Gyllenhal)	1	3	5	rt
Sitophilus granarius (Linnaeus)	1	3	5	g
Scolytus ?scolytus (Fabricius)	1	3	5	l
Scolytus sp.	1	3	5	l

Appendix 5. Summary of main statistics for the scan-recorded assemblages from The Bedern, south-west Area X (1973-81.13 X) and north-east Areas II and IV (1976-81.14 II, IV). Key: N, S — means of sample values; PNOB etc. — percentages of main ecological categories (see Hall and Kenward 1990) calculated for the sum of records from all samples (rather than means of sample values); alpha, alpha OB, alpha RT — based on mean of sample values where the standard error is less than the value of alpha, the number of cases meeting this criterion being stated.

Statistic	All Areas	Area II (51	Area IV (18	Area X (75
N (concentration by NMI)	36.3	56.0	12.2	29.2
S number of taxa	19.0	30.4	8.3	14.0
alpha	45 (62 cases)	47 (33 cases)	46 (2 cases)	41 (27 cases)
PNOB	8.0	8.1	10.5	7.1
alpha OB	- (1 case)	- (1 case)	- (0 cases)	- (0 cases)
PNW	1.6	2.1	2.3	0.9
PND	1.8	2.3	1.4	1.2
PNP	2.7	2.6	1.8	2.9
PNM	0.0	0.0	0.0	0.0
PNL	5.6	4.2	18.2	6.4
PNG	2.9	1.3	1.8	5.1
PNRT	61.5	63.6	52.3	60.3
PNRD	23.8	20.2	27.3	28.4
PNRF	3.8	5.1	2.3	2.2
alpha RT	19 (55 cases)	22 (33 cases)	- (2 cases)	13 (20 cases)