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Summary

Subsamples from eight contexts of Roman date from the Old Grapes Lane site, Carlisle, were analysed for insect remains and eggs of intestinal parasitic nematodes. Insects from several of the samples gave evidence for material resembling stable manure. Some well fills gave groups of rather mixed nature, perhaps representing dumps. One surface deposit was very rich in grain pests, and appears to have incorporated spoiled grain, perhaps animal feed. No more than traces of parasite eggs were recorded.

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Evidence from insect remains and parasite eggs from the Old Grapes Lane B site, The Lanes, Carlisle: Technical report

by H.K.Kenward, M.Dainton*, I.K.Kemenés** and J.B.Carrott

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Introduction

This report outlines the evidence from the studies of insect (and other arthropod) remains and parasite eggs from the Old Grapes Lane B site, Carlisle (site code CAR 82 OGLB, abbreviated to OGLB in EAU records). The work constitutes part of the Lanes Project (1), carried out by the Carlisle Archaeological Unit under the direction of M. McCarthy. Companion reports are Kenward et al. (1992a; b); together these three represent the entomological and parasitological contributions to the first phase of the Lanes reports.

Methods

All the samples were collected by the excavators. Whilst none of the authors saw the site during the main phase of excavation, HKK did visit the Lanes area at a late stage of the program. Hence, the sampling strategy was one of on site selection rather than intensive sampling with post-excavation selection (the approach now favoured by the EAU). Samples were chosen by CAU for biological analysis and subsamples of approximately 1kg were provided for insect and parasite egg analysis.

The submitted subsamples were first examined in the laboratory and their sedimentary type and inclusions recorded on a standard *pro-forma*. A small amount of material was then removed from each sample to be tested for the presence of eggs of intestinal parasites, before the remainder was processed for insect remains.

Insect analysis

'Test' subsamples of 1kg were processed using the methods described by Kenward *et al* (1980), in a modified form (Kenward *et al*, 1986). Initially the flot was to be described in one of two ways; *scan recording* (now the standard method of the EAU) or *assessment recording* (methods described by Kenward 1992 and briefly by Kenward *et al*. 1992). In the event, the unusual nature of much of the material meant that all the flots were eventually scan recorded.

The species lists were entered in shorthand form to a PASCAL system written by HKK, which outputs ordered species lists and a number of 'main statistics' for each subsample assemblage, most of them based on ecological codes assigned to the recorded

species. The details of interpretation - in other words, the extraction of archaeological information - have changed over the years, but the basic approach is outlined by Kenward (1978), while more up to date accounts are given by Kenward (1988) and Hall and Kenward (1990) and a brief account relating to the Lanes Project is given by Kenward *et al.* (1992). These methods are applied to the assemblages of adult beetles together with most bugs.

The residues from paraffin floatation were examined quickly. Their general nature was recorded and some were checked closely to monitor the efficiency of the insect extraction.

Eggs of intestinal parasites

Analysis for the eggs of nematode gut parasites of vertebrates was carried out *via* a semi-quantitative survey of all available samples, using 'squashes' of raw sediment. This method has been used in the study of parasite eggs from the Old Grapes Lane A site (Kenward *et al.* 1992), Carlisle, where it was compared with a more elaborate method based on that recommended by the Ministry of Agriculture, Fisheries and Food (1977) for modern samples of faeces. It was found that at the depth of investigation feasible within this project the simpler method gave satisfactory results (Dainton 1992). For this, a small amount of sediment was collected from three separate points within the sampled material and homogenised in a little water. A drop of the resulting liquid was then placed on a 76x26 mm microscope slide and covered with a 22x50 mm cover slip. The whole mount was then rapidly scanned under a transmission microscope at x60 and the abundance of eggs recorded semi-quantitatively using a five point scale; one, trace (2-5), few (6-10), some (11-20) and many (probably more than 20).

Phase 3 [Late first century]

Context 290 ['Deposit']

Sample 9

Laboratory description - Mid-dark brown, moist, crumbly, then plastic, silty amorphous organic material. Very small stones (2-6 mm) were the only obvious inclusions.

Parasite eggs - None found.

Insects - A modest group of beetles and bugs (N = 55, S = 37) was accompanied by 'many' mites and a few other invertebrates. The material was scan recorded. The most abundant taxa were *Anotylus nitidulus* (11), *Platystethus arenarius* (5) and *Aphodius* sp. (3; one of the 'yellow' species). These probably indicate herbivore dung or other similar material. The remaining species (all with two or less individuals) included some which perhaps suggest that this was stable manure.

Phase 4E [Late first century]

Context 229 ['Deposit']

Sample 8

Laboratory description - Mid-dark brown brittle, then crumbly, then plastic (when worked), humic sandy (distinctly gritty texture) clay silt. Very small to medium sized stones (2-60 mm) and woody detritus were present.

Parasite eggs - None found.

Insects - The flot contained very large numbers (of the order of 100) of fly pupae, 'many' fly puparia, a human flea, 'several' Proctotrupoidea, about 50 mites and a few other remains, together with a rather substantial group of beetles and bugs (N = 122, S = 60). The material was scan recorded. Grain pests made up 11% of the assemblage; removing them had only a marginal effect on the main statistics, which are quoted for the whole assemblage. Diversity was moderate (α = 47, SE = 7), the proportion of outdoor forms large (%N OB = 30). This component of the assemblage was (ecologically) apparently quite varied, but of fairly low mathematical 'diversity' (α OB = 30, SE = 10), this statistic being depressed by the presence of a few moderately abundant taxa. The more numerous 'outdoor' forms were the rather eurytopic dung beetle *Aphodius ?prodromus*, the water beetle *Helophorus* sp., *Phyllopertha horticola* (a chafer), and *Lesteva longoelytrata*, found by water. Other phytophages included taxa perhaps imported in cut vegetation (although of course it is hard to rule out the possibility that these insects actually lived on the site).

The most abundant decomposer, at rank 1, was *Anotylus tetracarinatus* (11 individuals), a very abundant eurytopic species suspected of having the potential to occur in large numbers in 'background fauna'. The same may be true of *Platystethus arenarius* (6), which favours foul material, but the presence of these species *and* the *Aphodius* in such numbers suggests that they may have been autochthonous, or at least have originated very near by. This view is reinforced by the presence of three *Cercyon haemorrhoidalis*. This deposit may have contained herbivore dung, and have been invaded by some foul decomposers. Some taxa offered a hint of 'hay', and possibly the grain pests (there were nine *Oryzaephilus surinamensis*) arrived in animal feed.

Phase 4F [Late first century]

Context 211 [Wattle and cob wall]

Sample 7

Laboratory description - Heterogeneous: soft, mid brown, humic silt with some parts having a brittle, dark grey, gritty texture

and others consisting of rotted wood. Overall, moist, with very small stones (2-6 mm) the only obvious inclusions.

Parasite eggs - One *Trichuris* was noted.

Insects - Scan recorded. Beetles were rather abundant, but there was only a single adult bug of the group used in calculating statistics (N = 113, S = 54). Other remains included 'several' beetle larvae and fly puparia. Like the assemblage from sample 8 (context 229) this one was dominated by *Anotylus tetracarinatus*, but the remaining assemblage included representatives of some rather different communities. Decomposers were well represented overall (%N RT = 65), with the RD group important (%N RD = 20), and the RT group was of quite low diversity (α RT = 16, SE = 30). There were strong hints of a 'house fauna' element, with *Cryptophagus* sp. (8), *Anobium punctatum* (7), *Xylodomus concinnus* (5), and *Lathridius minutus* group (also 5). There was, however, also a small community of fouler material - particularly *Platystethus arenarius* and *Cercyon atricapillus* (both 3). There were hints of a 'hay' element, from *Mecinus pyraster* and *Gymnetron labile* (both associated with *Plantago* species - plantains), for example.

Overall, then, this deposit may have come from a building and, if not of mixed origins, may once again indicate stabling.

The record of *Abax parallelepipedus* is of note; common now, it is rather rarely recorded from urban archaeological deposits.

Phase 5A [Early-mid Second Century]

Context 184.1 [Well fill]

Sample 1

Laboratory description - Mid-dark brown, moist, crumbly then plastic when worked, silty amorphous organic material, slightly variable in texture, being more silty in places and apparently wholly organic in others. Very small and small stones (2-20 mm) were present.

Parasite eggs - None found.

Insects - Assessment-recorded, this subsample gave a small decomposer group with week hints of foul material. It was regarded as of low priority for further recording since a clear interpretation was unlikely to be arrived at.

Context 184.2 [Well fill]

Sample 5

Laboratory description - Dark brown, moist, brittle then plastic (when worked) amorphous organic matter and herbaceous detritus

(<2 mm). Very small stones (2-6 mm) and wood fragments were present, and there were also inclusions of pale silt.

Parasite eggs - None apparent.

Insects - Paraffin floatation produced a quite large flot, of which insects formed only a small proportion. The material was scan-recorded. There were 'many' mites and fly puparia, seven Homoptera nymphs, a few scale insects, a human flea, and an adult and a puparium of the sheep ked, *Melophagus ovinus*. There were various other invertebrates, including four kinds of Cladocera, represented by ephippia.

Beetles and bugs of the groups used to calculate main statistics were rather numerous (N = 126, S = 70). Diversity was moderately high (α = 65, SE = 10) and a large outdoor component was present (%N OB = 40, %S OB = 44). The latter component was of (relatively) low diversity (α OB = 34, SE = 9). Aquatics were quite numerous (%N W = 10), as were phytophages (%N P = 19). Decomposers accounted for just under half of the fauna (%N RT = 48); of these, a significant proportion was contributed by RD and RF taxa (%N RD = 18, %N RF = 13). This was thus an assemblage in which several communities were strongly developed. The aquatics appeared to indicate deposition in or by water, although the forms represented (three *Helophorus* species and *Hydrobius fuscipes*) are all highly migratory invaders of temporary water.

Dung beetles were sufficiently numerous to suggest a nearby origin at least (seven *Aphodius prodromus*) but, in contrast, a likely 'house fauna' component was evident, *Anobium punctatum* (7), *Lathridius minutus* group (7), *Cryptophagus* sp. (6), *Ptinus fur* (4), and *Typhaea stercorea* (3) being the most abundant. The rich group of phytophages (and some other outdoor taxa) *may* have been background fauna, but the taxa represented seem quite likely to have been imported in cut 'hay'. There were weak traces of a decomposer community which might colonise stable manure. On balance, this material appears likely (but not certain) originally to have been deposited in a stable or animal byre, or in an open area where stock was concentrated. A small 'moorland/heathland' component was present: *Lochmaea suturalis* and *Micrelus ericae*. The three *Phyllopertha horticola* may belong to this group (it is sometimes numerous in acid turf at the transition from poor grazing to moorland) or may have come in cut vegetation.

Context 184.3 [Well fill]

Sample 6

Laboratory description - Mid-dark brown, moist, crumbly, plastic when worked, humic sandy silty clay with cm-scale mottles of mid-dark grey, probably indicating reduction, and numerous vari-coloured patches (white to black). Very small stones (2-6 mm) were common and ?ash was present.

Parasite eggs - None found.

Insects - There were many 'mites', but other arthropods were not abundant, and there were only 42 individuals of 30 beetle taxa. Bearing in mind the small size of this group, main statistics were of limited significance. There was, however a quite large proportion of decomposers (almost three-fifths), of which well over a third were coded 'rd'. There were five *Oryzaephilus surinamensis*, and three each of *Lathridius minutus* group and a *Corticaria* species, but only one or two individuals of the remaining taxa. This group (subjectively) strongly resembled a small random extract from some of the other assemblages from this site, with hints of 'stable manure'.

Context 188 ['Deposit']

Sample 4

Laboratory description - Mid brown moist, plastic and slightly sticky, slightly sandy silty clay with lighter and darker patches which had a different texture. Very small and small stones (2-20 mm) were present.

Parasite eggs - None apparent.

Insects - This material was initially assessment-recorded (but see below). This showed that the flot, of modest size, contained a very large number of insect fragments, and would require sorting onto damp filter paper for rapid quantification. However, it was clear that the great majority of the beetles were grain pests, including the four species typically encountered in Roman material in about the usual proportions. There were perhaps well over 200 *Oryzaephilus surinamensis*, a quite large number of *Cryptolestes pusillus*, modest numbers of *Sitophilus granarius* and a few *Palorus ratzeburgi*. Other than these, there may have been no more than twenty individuals of assorted ecological origins, a group of little interpretative significance. In view of the characteristic nature of this material, more precise recording could not be justified in terms of archaeological reconstruction. Since an attempt was made to note all taxa and their approximate frequencies, the record can be regarded as a semi-quantitative rapid scan (Kenward, 1992) and main statistics have been calculated for the whole assemblage.

This was probably a spoiling grain residue of some kind, or processually or spatially close to such material. There may have been a few invading decomposers, and just possibly some 'hay' insects, but most of these minor elements could have been strays; deposition was probably in a protected place.

Phase 5B [Early-mid Second Century]

Context 173 ['Deposit']

Sample 3

Laboratory description - Mid brown, just moist, brittle, then crumbly, then plastic, humic silty clay. Small stones (6-20 mm) and wood fragments were present.

Parasite eggs - One *Trichuris* was recorded.

Insects - Insects were not very abundant, with a small assortment of remains including 30 individuals of 26 beetle taxa (scan recording). Decomposers formed only a third of the assemblage, and over a quarter of the individuals were 'outdoor' forms. The material resembled a random extract from an average assemblage for this site.

General discussion

Where interpretation was possible, the insect assemblages from OGLB suggested a predominance of 'stable manure' deposits among the sampled layers. This interpretation is probably correct, but the evidence is not as plain as in some groups from other sites (e.g. Tanner Row, York, Hall and Kenward 1990). It might be, for example, that the 'hay' taxa originated from weedy vegetation growing on the site. On balance, this was probably not so.

The role of *Phyllopertha horticola* in relation to 'hay' insects requires further investigation in view of its abundance at OGLB and its regular occurrence at some other sites. This chafer is sometimes immensely common at the present day in poor pasture, typically in acid uplands. It may thus have been a component of the local fauna, sufficiently numerous to be a constant, and occasionally quite abundant, element of the 'background fauna' of insects entering deposits by chance. Equally, however, corpses may have been brought in turf; it has been found in samples where other insects strongly suggest that this may have been so. Thirdly, this clumsy chafer may easily have been trapped when herbaceous vegetation was cut for hay. Its reported extreme abundance at some localities in some years would make accidental importation of quite large numbers in this way perfectly possible.

The moorland/heathland element occasionally abundant elsewhere at the Lanes (e.g. Kenward *et al.* 1992b) was present at OGLB, but never strongly represented. Similarly, aquatic habitats, although probably present, did not feature strongly as contributors to the OGLB assemblages (although eurytopic, mobile water beetles were moderately common and one sample gave single individuals of what were interpreted as four different species of water flea).

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Table 1. Summary of main statistics for the scan-recorded assemblages from OGLB. The material is treated as a single unit. 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 mean 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 samples (7 cases)
N (= concentration by MNI)	79.2
number of taxa (S)	42.2
alpha	50 (7 cases)
PNOB	26.1
Alpha OB	- (2 cases)
PNW	4.9
PND	3.8
PNP	11.7
PNM	0.5
PNL	4.0
PNG	23.4
PNRT	55.6
PNRD	17.1
PNRF	9.4
alpha RT	15 (5 cases)

Table 2. Complete list of invertebrate taxa recorded from OGLB. Conventions: 'sp(?).' - indicates probable additional taxon; 'sp(?). indet.' - indicates may be (or include) previously listed taxa. Order and nomenclature for Insecta follows Kloet and Hincks (1964-77).

Annelida

Oligochaeta sp. (egg capsule)

Crustacea

Daphnia sp. (ephippium)
Cladocera spp. (ephippium)

Insecta

Dermaptera

Dermaptera sp.

Mallophaga or Anoplura

Louse (s.l.) sp.

Psocoptera

Psocoptera sp.

Hemiptera

Lygaeidae sp.
Lyctocoris campestris (Fabricius)
Miridae sp.
Saldidae sp.
Heteroptera sp. (nymph)
Ulopa reticulata (Fabricius)
Megophthalmus ?scanicus (Fallen)
Conomelus anceps (Germar)
Auchenorhyncha spp.
Auchenorhyncha sp. (nymph)
Aphidoidea sp.
Coccoidea sp.
Hemiptera sp. (nymph)

Diptera

Syrphidae sp. (larva)
Melophagus ovinus (Linnaeus) (adult)
Melophagus ovinus (puparium)
Diptera spp. (adult)
Diptera spp. (pupa)
Diptera spp. (puparium)

Siphonaptera

Pulex irritans Linnaeus
Siphonaptera sp. indet.

Coleoptera

Nebria sp.
Notiophilus sp.
Dyschirius ?globosus (Herbst)
Clivina fossor (Linnaeus)
Trechus obtusus Erichson or *quadristriatus* (Schrank)
Bembidion (*Philochthus*) sp.
Bembidion sp.
Abax parallelepipedus (Piller and Mitterpacher)
Calathus fuscipes (Goeze)
Amara sp.
?Lebiini sp.
Carabidae spp.
Helophorus grandis Illiger
Helophorus aquaticus (Linnaeus) or *grandis*
Helophorus spp.
Cercyon analis (Paykull)
Cercyon atricapillus (Marsham)
Cercyon haemorrhoidalis (Fabricius)
Cercyon melanocephalus (Linnaeus)
Cercyon spp. indet.
Megasternum obscurum (Marsham)
Cryptopleurum minutum (Fabricius)
Hydrobius fuscipes (Linnaeus)
Acritus nigricornis (Hoffmann)
Onthophilus striatus (Forster)
Ochthebius sp.
Acrotrichis sp.
Silpha sp.
Scydmaenidae sp.
Micropeplus sp.
Lesteva ?longoelytrata (Goeze)
Phyllodrepa ?floralis (Paykull)
Omalium ?rivulare (Paykull)
Omalium sp.
Xylodromus concinnus (Marsham)
Carpelimus ?bilineatus Stephens
Carpelimus pusillus (Gravenhorst) group
Platystethus arenarius (Fourcroy)
Anotylus nitidulus (Gravenhorst)
Anotylus rugosus (Fabricius)
Anotylus tetracarinatus (Block)
Oxytelus laqueatus (Marsham)
Oxytelus sculptus Gravenhorst
Stenus spp.
Euaesthetus bipunctatus (Ljungh)
Euaesthetus sp.
Leptacinus spp.
Gyrohypnus ?angustatus Stephens
Gyrohypnus ?punctulatus (Paykull)

Gyrohypnus sp. indet.
Xantholinus linearis (Olivier) group
Xantholinus sp.
Neobisnius sp.
Philonthus spp.
Philonthus or *Gabrius* sp.
Staphylininae sp.
Tachyporus sp.
Tachinus laticollis Gravenhorst or *marginellus* (Fabricius)
Tachinus ?signatus Gravenhorst
Tachinus sp.
Cordalia obscura (Gravenhorst)
Falagria sp.
Aleochara sp.
Aleocharinae spp.
Geotrupes sp.
Aphodius ?granarius (Linnaeus)
Aphodius ?prodromus (Brahm)
Aphodius spp.
Phyllopertha horticola (Linnaeus)
Melolonthinae/Rutelinae/Cetoninae sp.
Cyphon sp.
Byrrhidae sp.
?Denticollis linearis (Linnaeus) (larva)
Elateridae sp.
Anobium punctatum (Degeer)
Anobiidae sp.
Ptinus fur (Linnaeus)
Lyctus linearis (Goeze)
Meligethes sp.
Monotoma ?longicollis Gyllenhal
Monotoma picipes Herbst
Monotoma sp.
Cryptolestes ferrugineus (Stephens)
Oryzaephilus surinamensis(Linnaeus)
Cryptophagus ?scutellatus Newman
Cryptophagus spp.
Atomaria spp.
Ephistemus globulus (Paykull)
Lathridius minutus (Linnaeus) group
Enicmus sp.
Dienerella sp.
Corticaria spp.
Corticarina or *Cortinicara* sp.
Typhaea stercorea (Linnaeus)
Palorus ratzeburgi (Wissmann)
Anthicus formicarius (Goeze)
Anthicus floralis (Linnaeus) or *formicarius*
Chrysolina sp.
Gastrophysa viridula (Degeer)
Chrysomelinae sp.
Lochmaea suturalis (Thomson)
Longitarsus spp.
Halticinae sp.
Apion spp.
Sitona sp.

Hypera sp.
Cossoninae sp.
Sitophilus granarius (Linnaeus)
Notaris acridulus (Linnaeus)
Micrelus ericae (Gyllenhal)
Ceuthorhynchinae sp.
Mecinus pyraster (Herbst)
Gymnetron labile (Herbst)
Curculionidae sp.
Scolytidae sp.
Coleoptera sp.
Coleoptera sp. (larva)

Hymenoptera

Chalcidoidea sp.
Proctotrupoidea sp.
Formicidae sp.
Hymenoptera Parasitica sp.

Insecta sp. (larva)

Arachnida

Acarina sp.
Aranae sp.

Appendix: Main statistics and lists in rank order for the scan-recorded assemblages of adult beetles and bugs from the Old Grapes Lane B site, Carlisle.

The material is listed in sample number order. Main statistics are given in full for assemblages with ten or more adult Coleoptera and Hemiptera of the groups used in preparing statistics. Number - minimum number of individuals; % - percentage for that taxon in the assemblage; Rank - rank position in the assemblage; Ecodes - ecological codes assigned to the taxon for the purposes of computing assemblage statistics. Erosion and fragmentation are on five point scales, with 1 = very well preserved through to 5 = very poorly preserved.

Where a sample is recorded as having 'no records of beetles and bugs' this may be because none were present or because the material was assessment-recorded. See text for further information.

Site: OGLB82 Context: 184.1 Sample: 1/T - beetle/bug main statistics

Erosion = 0 Fragmentation = 0; Weight = 1.000kg

Number of individuals estimated as	N =	12
Number of taxa	S =	10
Index of diversity not calculated, n = s or n < 20		
Number of 'certain' outdoor taxa	SOA =	1
Percentage of 'certain' outdoor taxa	%SOA =	10
Number of 'certain' outdoor individuals	NOA =	1
Percentage of 'certain' outdoor individuals	%NOA =	8
Number of 'certain' and probable outdoor taxa	SOB =	2
Percentage of 'certain' and probable outdoor taxa	%SOB =	20
Number of 'certain' and probable outdoor individuals	NOB =	2
Percentage 'certain' and probable outdoor individuals	%NOB =	17
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 =	1
Percentage of strongly plant-associated taxa	%SP =	10
Number of strongly plant-associated individuals	NP =	1
Percentage of strongly plant-associated individuals	%NP =	8
Number of heathland/moorland taxa	SM =	1
Number of heathland/moorland individuals	NM =	1
Percentage of heathland/moorland individuals	%NM =	8
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 =	6
Percentage of decomposer taxa	%SRT =	60
Number of decomposer individuals	NRT =	8
Percentage of decomposer individuals	%NRT =	67
Number of 'dry' decomposer taxa	SRD =	1
Percentage of 'dry'decomposer taxa	%SRD =	10
Number of 'dry' decomposer individuals	NRD =	1
Percentage of 'dry'decomposer individuals	%NRD =	8
Number of 'foul' decomposer taxa	SRF =	3
Percentage of 'foul' decomposer taxa	%SRF =	30
Number of 'foul' decomposer individuals	NRF =	4
Percentage of 'foul' decomposer individuals	%NRF =	33
Diversity index for RT not calculated, NRT = SRT or NRT < 20		
Number of individuals of grain pests	NG =	2
Percentage of individuals of grain pests	%NG =	17
Number of individuals of grain pests	NG =	2
Number of uncoded taxa	SU =	1
Percentage of uncoded individuals	PNU =	8

Site: OGLB82 Context: 184.1 Sample: 1/T - species list in rank order

Taxon	Number	%	Rank	Ecodes
Cercyon atricapillus (Marsham)	2	17	1	rf
Oxytelus sculptus Gravenhorst	2	17	1	rt
Ulopa reticulata (Fabricius)	1	8	3	oa p m
Platystethus arenarius (Fourcroy)	1	8	3	rf
Gyrohypnus sp.	1	8	3	rt
Tachinus laticollis or marginellus	1	8	3	u
Aphodius sp.	1	8	3	ob rf
Cryptolestes ferrugineus (Stephens)	1	8	3	g
Oryzaephilus surinamensis (Linnaeus)	1	8	3	g
Typhaea stercorea (Linnaeus)	1	8	3	rd

Site: OGLB82 Context: 173 Sample: 3/T - beetle/bug main statistics

Erosion = 4 Fragmentation = 4; Weight = 1.000kg

Number of individuals estimated as	N =	30
Number of taxa	S =	26
Index of diversity (alpha)	alpha =	90
Standard error of alpha	SE alpha =	46
Number of 'certain' outdoor taxa	SOA =	6
Percentage of 'certain' outdoor taxa	%SOA =	23
Number of 'certain' outdoor individuals	NOA =	6
Percentage of 'certain' outdoor individuals	%NOA =	20
Number of 'certain' and probable outdoor taxa	SOB =	8
Percentage of 'certain' and probable outdoor taxa	%SOB =	31
Number of 'certain' and probable outdoor individuals	NOB =	8
Percentage 'certain' and probable outdoor individuals	%NOB =	27
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 =	3
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 =	3
Percentage of strongly plant-associated taxa	%SP =	12
Number of strongly plant-associated individuals	NP =	3
Percentage of strongly plant-associated individuals	%NP =	10
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 =	3
Number of decomposer taxa	SRT =	10
Percentage of decomposer taxa	%SRT =	38
Number of decomposer individuals	NRT =	10
Percentage of decomposer individuals	%NRT =	33
Number of 'dry' decomposer taxa	SRD =	3
Percentage of 'dry'decomposer taxa	%SRD =	12

Number of 'dry' decomposer individuals	NRD =	3
Percentage of 'dry'decomposer individuals	%NRD =	10
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

Diversity index for RT not calculated, NRT = SRT or NRT < 20

Number of individuals of grain pests	NG =	4
Percentage of individuals of grain pests	%NG =	13
Number of individuals of grain pests	NG =	4
Number of uncoded taxa	SU =	6
Percentage of uncoded individuals	PNU =	27

Site: OGLB82 Context: 173 Sample: 3/T - species list in rank order

Taxon	Number	%	Rank	Ecodes
Oryzaephilus surinamensis (Linnaeus)	3	10	1	g
Philonthus or Gabrius sp.	2	7	2	u
Aleocharinae sp. C	2	7	2	u
Dyschirius ?globosus (Herbst)	1	3	4	oa
Bembidion sp.	1	3	4	oa
Carabidae sp.	1	3	4	ob
Helophorus ?grandis Illiger	1	3	4	oa w
Cercyon analis (Paykull)	1	3	4	rt
Acritus nigricornis (Hoffmann)	1	3	4	rt
Omalium ?rivulare (Paykull)	1	3	4	rt
Anotylus rugosus (Fabricius)	1	3	4	rt
Stenus sp.	1	3	4	u
Neobisnius sp.	1	3	4	u
Falagria sp.	1	3	4	rt
Aleocharinae sp. A	1	3	4	u
Aleocharinae sp. B	1	3	4	u
Aphodius ?granarius (Linnaeus)	1	3	4	ob rf
Phyllopertha horticola (Linnaeus)	1	3	4	oa p
Byrrhidae sp.	1	3	4	oa p
Anobiidae sp.	1	3	4	l
Cryptolestes ferrugineus (Stephens)	1	3	4	g
Cryptophagus sp.	1	3	4	rd
Lathridius minutus group	1	3	4	rd
Corticarina or Cortinicara sp.	1	3	4	rt
Typhaea stercorea (Linnaeus)	1	3	4	rd
Apion sp.	1	3	4	oa p

Site: OGLB82 Context: 188 Sample: 4/T - beetle/bug main statistics

Erosion = 0 Fragmentation = 0; Weight = 1.000kg

Number of individuals estimated as	N =	67
Number of taxa	S =	19
Index of diversity (alpha)	alpha =	9
Standard error of alpha	SE alpha =	2
Number of 'certain' outdoor taxa	SOA =	5
Percentage of 'certain' outdoor taxa	%SOA =	26
Number of 'certain' outdoor individuals	NOA =	5
Percentage of 'certain' outdoor individuals	%NOA =	7

Number of 'certain' and probable outdoor taxa	SOB =	7
Percentage of 'certain' and probable outdoor taxa	%SOB =	37
Number of 'certain' and probable outdoor individuals	NOB =	7
Percentage 'certain' and probable outdoor individuals	%NOB =	10
Diversity index for OB not calculated, NOB = SOB or NOB < 20		
Number of aquatic taxa	SW =	1
Percentage of aquatic taxa	%SW =	5
Number of aquatic individuals	NW =	1
Percentage of aquatic individuals	%NW =	1
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 =	3
Percentage of strongly plant-associated taxa	%SP =	16
Number of strongly plant-associated individuals	NP =	3
Percentage of strongly plant-associated individuals	%NP =	4
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 =	6
Percentage of decomposer taxa	%SRT =	32
Number of decomposer individuals	NRT =	7
Percentage of decomposer individuals	%NRT =	10
Number of 'dry' decomposer taxa	SRD =	2
Percentage of 'dry'decomposer taxa	%SRD =	11
Number of 'dry' decomposer individuals	NRD =	3
Percentage of 'dry'decomposer individuals	%NRD =	4
Number of 'foul' decomposer taxa	SRF =	1
Percentage of 'foul' decomposer taxa	%SRF =	5
Number of 'foul' decomposer individuals	NRF =	1
Percentage of 'foul' decomposer individuals	%NRF =	1
Diversity index for RT not calculated, NRT = SRT or NRT < 20		
Number of individuals of grain pests	NG =	51
Percentage of individuals of grain pests	%NG =	76
NB - over 10% grain pests and n > 50: for corrected re-run see over.		
Number of individuals of grain pests	NG =	51
Number of uncoded taxa	SU =	3
Percentage of uncoded individuals	PNU =	4

Site: OGLB82 Context: 188 Sample: 4/T - beetle/bug main statistics re-run after subtraction of grain pest component

Erosion = 0 Fragmentation = 0; Weight = 1.000kg

Number of individuals estimated as	N =	16
Number of taxa	S =	15
Index of diversity not calculated, n = s or n < 20		
Number of 'certain' outdoor taxa	SOA =	5
Percentage of 'certain' outdoor taxa	%SOA =	33
Number of 'certain' outdoor individuals	NOA =	5
Percentage of 'certain' outdoor individuals	%NOA =	31
Number of 'certain' and probable outdoor taxa	SOB =	7

Percentage of 'certain' and probable outdoor taxa	%SOB =	47
Number of 'certain' and probable outdoor individuals	NOB =	7
Percentage 'certain' and probable outdoor individuals	%NOB =	44
Diversity index for OB not calculated, NOB = SOB or NOB < 20		
Number of aquatic taxa	SW =	1
Percentage of aquatic taxa	%SW =	7
Number of aquatic individuals	NW =	1
Percentage of aquatic individuals	%NW =	6
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 =	3
Percentage of strongly plant-associated taxa	%SP =	20
Number of strongly plant-associated individuals	NP =	3
Percentage of strongly plant-associated individuals	%NP =	19
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 =	6
Percentage of decomposer taxa	%SRT =	40
Number of decomposer individuals	NRT =	7
Percentage of decomposer individuals	%NRT =	44
Number of 'dry' decomposer taxa	SRD =	2
Percentage of 'dry'decomposer taxa	%SRD =	13
Number of 'dry' decomposer individuals	NRD =	3
Percentage of 'dry'decomposer individuals	%NRD =	19
Number of 'foul' decomposer taxa	SRF =	1
Percentage of 'foul' decomposer taxa	%SRF =	7
Number of 'foul' decomposer individuals	NRF =	1
Percentage of 'foul' decomposer individuals	%NRF =	6
Diversity index for RT not calculated, NRT = SRT or NRT < 20		
Number of individuals of grain pests	NG =	51
Number of uncoded taxa	SU =	3
Percentage of uncoded individuals	PNU =	19

Site: OGLB82 Context: 188 Sample: 4/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
Cryptolestes ferrugineus (Stephens)*	15	22	1	g
Oryzaephilus surinamensis (Linnaeus)*	15	22	1	g
Sitophilus granarius (Linnaeus)*	15	22	1	g
Palorus ratzeburgi (Wissman)*	6	9	4	g
Lyctocoris campestris (Fabricius)	2	3	5	rd
Lygaeidae sp.	1	1	6	oa p
Clivina fossor (Linnaeus)	1	1	6	oa
Carabidae sp.	1	1	6	ob
Helophorus sp.	1	1	6	oa w
Cercyon analis (Paykull)	1	1	6	rt

Philonthus sp.	1	1	6	u
Aleocharinae sp.	1	1	6	u
Aphodius sp.	1	1	6	ob rf
Cryptophagus sp.	1	1	6	rd
Corticaria sp.	1	1	6	rt
Anthicus floralis or formicarius	1	1	6	rt
Longitarsus sp.	1	1	6	oa p
Apion sp.	1	1	6	oa p
Coleoptera sp.	1	1	6	u

Site: OGLB82 Context: 184.2 Sample: 5/T - beetle/bug main statistics

Erosion = 3 Fragmentation = 4; Weight = 1.000kg

Number of individuals estimated as	N =	126
Number of taxa	S =	70
Index of diversity (alpha)	alpha =	65
Standard error of alpha	SE alpha =	10
Number of 'certain' outdoor taxa	SOA =	27
Percentage of 'certain' outdoor taxa	%SOA =	39
Number of 'certain' outdoor individuals	NOA =	41
Percentage of 'certain' outdoor individuals	%NOA =	33
Number of 'certain' and probable outdoor taxa	SOB =	31
Percentage of 'certain' and probable outdoor taxa	%SOB =	44
Number of 'certain' and probable outdoor individuals	NOB =	51
Percentage 'certain' and probable outdoor individuals	%NOB =	40
Index of diversity of outdoor component	alpha OB =	34
Standard error	SE alpha OB =	9
Number of aquatic taxa	SW =	4
Percentage of aquatic taxa	%SW =	6
Number of aquatic individuals	NW =	13
Percentage of aquatic individuals	%NW =	10
Number of damp ground/waterside taxa	SD =	1
Percentage of damp ground/waterside taxa	%SD =	1
Number of damp ground/waterside individuals	ND =	1
Percentage of damp ground/waterside individuals	%ND =	1
Number of strongly plant-associated taxa	SP =	20
Percentage of strongly plant-associated taxa	%SP =	29
Number of strongly plant-associated individuals	NP =	24
Percentage of strongly plant-associated individuals	%NP =	19
Number of heathland/moorland taxa	SM =	2
Number of heathland/moorland individuals	NM =	2
Percentage of heathland/moorland individuals	%NM =	2
Number of wood-associated taxa	SL =	1
Number of wood-associated individuals	NL =	7
Percentage of wood-associated individuals	%NL =	6
Number of decomposer taxa	SRT =	29
Percentage of decomposer taxa	%SRT =	41
Number of decomposer individuals	NRT =	60
Percentage of decomposer individuals	%NRT =	48
Number of 'dry' decomposer taxa	SRD =	7
Percentage of 'dry'decomposer taxa	%SRD =	10
Number of 'dry' decomposer individuals	NRD =	23

Percentage of 'dry'decomposer individuals	%NRD =	18
Number of 'foul' decomposer taxa	SRF =	8
Percentage of 'foul' decomposer taxa	%SRF =	11
Number of 'foul' decomposer individuals	NRF =	16
Percentage of 'foul' decomposer individuals	%NRF =	13
Index of diversity of decomposer component	alpha RT =	22
Standard error	SE alpha RT =	5
Number of individuals of grain pests	NG =	6
Percentage of individuals of grain pests	%NG =	5
Number of individuals of grain pests	NG =	6
Number of uncoded taxa	SU =	9
Percentage of uncoded individuals	PNU =	10

Site: OGLB82 Context: 184.2 Sample: 5/T - species list in rank order

Taxon	Number	%	Rank	Ecodes
Helophorus aquaticus or grandis	7	6	1	oa w
Aphodius ?prodromus (Brahm)	7	6	1	ob rf
Anobium punctatum (Degeer)	7	6	1	l
Lathridius minutus group	7	6	1	rd
Cryptophagus sp.	6	5	5	rd
Ptinus fur (Linnaeus)	4	3	6	rd
Corticaria sp. A	4	3	6	rt
Helophorus sp. A	3	2	8	oa w
Staphylininae sp.	3	2	8	u
Phyllopertha horticola (Linnaeus)	3	2	8	oa p
Oryzaephilus surinamensis (Linnaeus)	3	2	8	g
Typhaea stercorea (Linnaeus)	3	2	8	rd
Amara sp.	2	2	13	oa
Helophorus sp. B	2	2	13	oa w
Cercyon haemorrhoidalis (Fabricius)	2	2	13	rf
Cercyon melanocephalus (Linnaeus)	2	2	13	rt
Megasternum obscurum (Marsham)	2	2	13	rt
Omalium ?rivulare (Paykull)	2	2	13	rt
Platystethus arenarius (Fourcroy)	2	2	13	rf
Neobisnius sp.	2	2	13	u
Meligethes sp.	2	2	13	oa p
Monotoma picipes Herbst	2	2	13	rt
Longitarsus sp. B	2	2	13	oa p
Lygaeidae sp.	1	1	24	oa p
Megophthalmus ?scanicus	1	1	24	oa p
Conomelus anceps (Germar)	1	1	24	oa p
Auchenorhyncha sp. A	1	1	24	oa p
Auchenorhyncha sp. B	1	1	24	oa p
Auchenorhyncha sp. C	1	1	24	oa p
Auchenorhyncha sp. D	1	1	24	oa p
Cryptopleurum minutum (Fabricius)	1	1	24	rf
Hydrobius fuscipes (Linnaeus)	1	1	24	oa w
Silpha sp.	1	1	24	u
Phyllodrepa ?floralis (Paykull)	1	1	24	rt
Omalium sp.	1	1	24	rt
Xylodromus concinnus (Marsham)	1	1	24	rt
Carpelimus pusillus group	1	1	24	u
Anotylus tetracarinatus (Block)	1	1	24	rt

Oxytelus laqueatus (Marsham)	1	1	24	rf
Oxytelus sculptus Gravenhorst	1	1	24	rt
Gyrohypnus ?angustatus Stephens	1	1	24	rt
Xantholinus linearis group (Olivier)	1	1	24	rt
Tachinus sp.	1	1	24	u
Aleochara sp.	1	1	24	u
Aleocharinae sp. A	1	1	24	u
Aleocharinae sp. B	1	1	24	u
Aleocharinae sp. C	1	1	24	u
Geotrupes sp.	1	1	24	oa rf
Aphodius sp. A	1	1	24	ob rf
Aphodius sp. B	1	1	24	ob rf
Melolonthinae/Rutelinae/Cetoninae sp.	1	1	24	oa p
Elateridae sp.	1	1	24	ob
Cryptolestes ferrugineus (Stephens)	1	1	24	g
Atomaria sp.	1	1	24	rd
Ephistemus globulus (Paykull)	1	1	24	rd
Dienerella sp.	1	1	24	rd
Corticaria sp. B	1	1	24	rt
Palorus ratzeburgi (Wissman)	1	1	24	g
Anthicus formicarius (Goeze)	1	1	24	rt
Gastrophysa viridula (Degeer)	1	1	24	oa p
Lochmaea suturalis (Thomson)	1	1	24	oa p m
Longitarsus sp. A	1	1	24	oa p
Apion sp.	1	1	24	oa p
Sitona sp.	1	1	24	oa p
Hypera sp.	1	1	24	oa p
Sitophilus granarius (Linnaeus)	1	1	24	g
Notaris acridulus (Linnaeus)	1	1	24	oa d p
Micrelus ericae (Gyllenhal)	1	1	24	oa p m
Mecinus pyraster (Herbst)	1	1	24	oa p
Curculionidae sp. A	1	1	24	oa

Site: OGLB82 Context: 184 Sample: 6/T - beetle/bug main statistics

Erosion = 3 Fragmentation = 3; Weight = 1.000kg

Number of individuals estimated as	N =	42
Number of taxa	S =	30
Index of diversity (alpha)	alpha =	48
Standard error of alpha	SE alpha =	16
Number of 'certain' outdoor taxa	SOA =	6
Percentage of 'certain' outdoor taxa	%SOA =	20
Number of 'certain' outdoor individuals	NOA =	6
Percentage of 'certain' outdoor individuals	%NOA =	14
Number of 'certain' and probable outdoor taxa	SOB =	7
Percentage of 'certain' and probable outdoor taxa	%SOB =	23
Number of 'certain' and probable outdoor individuals	NOB =	7
Percentage 'certain' and probable outdoor individuals	%NOB =	17
Diversity index for OB not calculated, NOB = SOB or NOB < 20		
Number of aquatic taxa	SW =	1
Percentage of aquatic taxa	%SW =	3
Number of aquatic individuals	NW =	1
Percentage of aquatic individuals	%NW =	2
Number of damp ground/waterside taxa	SD =	1
Percentage of damp ground/waterside taxa	%SD =	3

Number of damp ground/waterside individuals	ND =	1
Percentage of damp ground/waterside individuals	%ND =	2
Number of strongly plant-associated taxa	SP =	5
Percentage of strongly plant-associated taxa	%SP =	17
Number of strongly plant-associated individuals	NP =	5
Percentage of strongly plant-associated individuals	%NP =	12
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 =	2
Number of decomposer taxa	SRT =	16
Percentage of decomposer taxa	%SRT =	53
Number of decomposer individuals	NRT =	24
Percentage of decomposer individuals	%NRT =	57
Number of 'dry' decomposer taxa	SRD =	5
Percentage of 'dry'decomposer taxa	%SRD =	17
Number of 'dry' decomposer individuals	NRD =	9
Percentage of 'dry'decomposer individuals	%NRD =	21
Number of 'foul' decomposer taxa	SRF =	2
Percentage of 'foul' decomposer taxa	%SRF =	7
Number of 'foul' decomposer individuals	NRF =	3
Percentage of 'foul' decomposer individuals	%NRF =	7
Index of diversity of decomposer component	alpha RT =	21
Standard error	SE alpha RT =	9
Number of individuals of grain pests	NG =	7
Percentage of individuals of grain pests	%NG =	17
Number of individuals of grain pests	NG =	7
Number of uncoded taxa	SU =	4
Percentage of uncoded individuals	PNU =	10

Site: OGLB82 Context: 184 Sample: 6/T - species list in rank order

Taxon	Number	%	Rank	Ecodes
Oryzaephilus surinamensis (Linnaeus)	5	12	1	g
Lathridius minutus group	3	7	2	rd
Corticaria sp.	3	7	2	rt
Cercyon analis (Paykull)	2	5	4	rt
Platystethus arenarius (Fourcroy)	2	5	4	rf
Cryptophagus ?scutellatus Newman	2	5	4	rd
Cryptophagus sp.	2	5	4	rd
Helophorus sp.	1	2	8	oa w
Megasternum obscurum (Marsham)	1	2	8	rt
Acrotrichis sp.	1	2	8	rt
Phyllodrepa ?floralis (Paykull)	1	2	8	rt
Omalium sp.	1	2	8	rt
Anotylus nitidulus (Gravenhorst)	1	2	8	rt d
Stenus sp.	1	2	8	u
Staphylininae sp.	1	2	8	u
Tachyporus sp.	1	2	8	u
Cordalia obscura (Gravenhorst)	1	2	8	rt
Aleocharinae sp.	1	2	8	u
Aphodius sp.	1	2	8	ob rf
?Phyllopertha horticola (Linnaeus)	1	2	8	oa p

Anobiidae sp.	1	2	8	l
Cryptolestes ferrugineus (Stephens)	1	2	8	g
Atomaria sp.	1	2	8	rd
Typhaea stercorea (Linnaeus)	1	2	8	rd
Anthicus formicarius (Goeze)	1	2	8	rt
Chrysomelinae sp.	1	2	8	oa p
Halticinae sp.	1	2	8	oa p
Sitona sp.	1	2	8	oa p
Sitophilus granarius (Linnaeus)	1	2	8	g
?Mecinus pyraster (Herbst)	1	2	8	oa p

Site: OGLB82 Context: 211 Sample: 7/T - beetle/bug main statistics

Erosion = 3 Fragmentation = 3; Weight = 1.000kg

Number of individuals estimated as	N =	113
Number of taxa	S =	54
Index of diversity (alpha)	alpha =	41
Standard error of alpha	SE alpha =	6
Number of 'certain' outdoor taxa	SOA =	12
Percentage of 'certain' outdoor taxa	%SOA =	22
Number of 'certain' outdoor individuals	NOA =	15
Percentage of 'certain' outdoor individuals	%NOA =	13
Number of 'certain' and probable outdoor taxa	SOB =	14
Percentage of 'certain' and probable outdoor taxa	%SOB =	26
Number of 'certain' and probable outdoor individuals	NOB =	18
Percentage 'certain' and probable outdoor individuals	%NOB =	16
Diversity index for OB not calculated, NOB = SOB or NOB < 20		
Number of aquatic taxa	SW =	1
Percentage of aquatic taxa	%SW =	2
Number of aquatic individuals	NW =	2
Percentage of aquatic individuals	%NW =	2
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 =	8
Percentage of strongly plant-associated taxa	%SP =	15
Number of strongly plant-associated individuals	NP =	10
Percentage of strongly plant-associated individuals	%NP =	9
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 =	7
Percentage of wood-associated individuals	%NL =	6
Number of decomposer taxa	SRT =	27
Percentage of decomposer taxa	%SRT =	50
Number of decomposer individuals	NRT =	73
Percentage of decomposer individuals	%NRT =	65
Number of 'dry' decomposer taxa	SRD =	8
Percentage of 'dry'decomposer taxa	%SRD =	15
Number of 'dry' decomposer individuals	NRD =	23
Percentage of 'dry'decomposer individuals	%NRD =	20
Number of 'foul' decomposer taxa	SRF =	3
Percentage of 'foul' decomposer taxa	%SRF =	6

Number of 'foul' decomposer individuals	NRF =	8
Percentage of 'foul' decomposer individuals	%NRF =	7
Index of diversity of decomposer component	alpha RT =	16
Standard error	SE alpha RT =	3
Number of individuals of grain pests	NG =	3
Percentage of individuals of grain pests	%NG =	3
Number of individuals of grain pests	NG =	3
Number of uncoded taxa	SU =	12
Percentage of uncoded individuals	PNU =	12

Site: OGLB82 Context: 211 Sample: 7/T - species list in rank order

Taxon	Number	%	Rank	Ecodes
Anotylus tetracarinatus (Block)	14	12	1	rt
Cryptophagus sp.	8	7	2	rd
Anobium punctatum (Degeer)	7	6	3	l
Corticaria sp.	6	5	4	rt
Xylodromus concinnus (Marsham)	5	4	5	rt
Lathridius minutus group	5	4	5	rd
Cercyon atricapillus (Marsham)	3	3	7	rf
Platystethus arenarius (Fourcroy)	3	3	7	rf
Leptacinus sp. B	3	3	7	rt
Oryzaephilus surinamensis (Linnaeus)	3	3	7	g
Atomaria sp. A	3	3	7	rd
Helophorus grandis Illiger	2	2	12	oa w
Cercyon analis (Paykull)	2	2	12	rt
Falagria sp.	2	2	12	rt
Aleocharinae sp. A	2	2	12	u
Aleocharinae sp. B	2	2	12	u
Aphodius sp.	2	2	12	ob rf
Ptinus ?fur (Linnaeus)	2	2	12	rd
Typhaea stercorea (Linnaeus)	2	2	12	rd
Longitarsus sp.	2	2	12	oa p
Apion sp.	2	2	12	oa p
Auchenorhyncha sp.	1	1	22	oa p
Trechus obtusus or quadristriatus	1	1	22	oa
Abax parallelepipedus (Piller and Mitterpacher)	1	1	22	ob
Calathus fuscipes (Goeze)	1	1	22	oa
Cercyon sp.	1	1	22	u
Megasternum obscurum (Marsham)	1	1	22	rt
Acrotrichis sp.	1	1	22	rt
Omalium ?rivulare (Paykull)	1	1	22	rt
Carpelimus ?bilineatus Stephens	1	1	22	rt
Carpelimus pusillus group	1	1	22	u
Stenus sp.	1	1	22	u
Euaesthetus bipunctatus (Ljungh)	1	1	22	oa
Leptacinus sp. A	1	1	22	rt
Gyrohypnus ?punctulatus (Paykull)	1	1	22	rt
?Xantholinus sp.	1	1	22	u
Philonthus sp.	1	1	22	u
Tachyporus sp.	1	1	22	u
Aleocharinae sp. C	1	1	22	u
Aleocharinae sp. D	1	1	22	u
Aleocharinae sp. E	1	1	22	u
Phyllopertha horticola (Linnaeus)	1	1	22	oa p

Monotoma ?longicollis (Gyllenhall)	1	1	22	rt
Monotoma sp.	1	1	22	rt
Cryptophagus ?scutellatus Newman	1	1	22	rd
Atomaria sp. B	1	1	22	rd
Ephistemus globulus (Paykull)	1	1	22	rd
Enicmus sp.	1	1	22	rt
Anthicus ?formicarius (Goeze)	1	1	22	rt
?Gastrophysa viridula (Degeer)	1	1	22	oa p
Chrysomelinae sp.	1	1	22	oa p
Cossoninae sp.	1	1	22	u
Mecinus pyraster (Herbst)	1	1	22	oa p
Gymnetron labile (Herbst)	1	1	22	oa p

Site: OGLB82 Context: 229 Sample: 8/T - beetle/bug main statistics

Erosion = 2 Fragmentation = 3; Weight = 1.000kg

Number of individuals estimated as	N =	122
Number of taxa	S =	60
Index of diversity (alpha)	alpha =	47
Standard error of alpha	SE alpha =	7
Number of 'certain' outdoor taxa	SOA =	19
Percentage of 'certain' outdoor taxa	%SOA =	32
Number of 'certain' outdoor individuals	NOA =	28
Percentage of 'certain' outdoor individuals	%NOA =	23
Number of 'certain' and probable outdoor taxa	SOB =	24
Percentage of 'certain' and probable outdoor taxa	%SOB =	40
Number of 'certain' and probable outdoor individuals	NOB =	37
Percentage 'certain' and probable outdoor individuals	%NOB =	30
Index of diversity of outdoor component	alpha OB =	30
Standard error	SE alpha OB =	10
Number of aquatic taxa	SW =	3
Percentage of aquatic taxa	%SW =	5
Number of aquatic individuals	NW =	6
Percentage of aquatic individuals	%NW =	5
Number of damp ground/waterside taxa	SD =	4
Percentage of damp ground/waterside taxa	%SD =	7
Number of damp ground/waterside individuals	ND =	8
Percentage of damp ground/waterside individuals	%ND =	7
Number of strongly plant-associated taxa	SP =	9
Percentage of strongly plant-associated taxa	%SP =	15
Number of strongly plant-associated individuals	NP =	13
Percentage of strongly plant-associated individuals	%NP =	11
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 =	3
Number of wood-associated individuals	NL =	6
Percentage of wood-associated individuals	%NL =	5
Number of decomposer taxa	SRT =	20
Percentage of decomposer taxa	%SRT =	33
Number of decomposer individuals	NRT =	59
Percentage of decomposer individuals	%NRT =	48
Number of 'dry' decomposer taxa	SRD =	5
Percentage of 'dry'decomposer taxa	%SRD =	8
Number of 'dry' decomposer individuals	NRD =	18

Percentage of 'dry'decomposer individuals	%NRD =	15
Number of 'foul' decomposer taxa	SRF =	3
Percentage of 'foul' decomposer taxa	%SRF =	5
Number of 'foul' decomposer individuals	NRF =	14
Percentage of 'foul' decomposer individuals	%NRF =	11
Index of diversity of decomposer component	alpha RT =	11
Standard error	SE alpha RT =	2
Number of individuals of grain pests	NG =	13
Percentage of individuals of grain pests	%NG =	11

NB - over 10% grain pests and n > 50: for corrected re-run see over.

Number of individuals of grain pests	NG =	13
Number of uncoded taxa	SU =	10
Percentage of uncoded individuals	PNU =	10

Site: OGLB82 Context: 229 Sample: 8/T - beetle/bug main statistics re-run after subtraction of grain pest component

Erosion = 2 Fragmentation = 3; Weight = 1.000kg

Number of individuals estimated as	N =	109
Number of taxa	S =	56
Index of diversity (alpha)	alpha =	46
Standard error of alpha	SE alpha =	8
Number of 'certain' outdoor taxa	SOA =	19
Percentage of 'certain' outdoor taxa	%SOA =	34
Number of 'certain' outdoor individuals	NOA =	28
Percentage of 'certain' outdoor individuals	%NOA =	26
Number of 'certain' and probable outdoor taxa	SOB =	24
Percentage of 'certain' and probable outdoor taxa	%SOB =	43
Number of 'certain' and probable outdoor individuals	NOB =	37
Percentage 'certain' and probable outdoor individuals	%NOB =	34
Index of diversity of outdoor component	alpha OB =	30
Standard error	SE alpha OB =	10
Number of aquatic taxa	SW =	3
Percentage of aquatic taxa	%SW =	5
Number of aquatic individuals	NW =	6
Percentage of aquatic individuals	%NW =	6
Number of damp ground/waterside taxa	SD =	4
Percentage of damp ground/waterside taxa	%SD =	7
Number of damp ground/waterside individuals	ND =	8
Percentage of damp ground/waterside individuals	%ND =	7
Number of strongly plant-associated taxa	SP =	9
Percentage of strongly plant-associated taxa	%SP =	16
Number of strongly plant-associated individuals	NP =	13
Percentage of strongly plant-associated individuals	%NP =	12
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 =	3
Number of wood-associated individuals	NL =	6
Percentage of wood-associated individuals	%NL =	6
Number of decomposer taxa	SRT =	20
Percentage of decomposer taxa	%SRT =	36
Number of decomposer individuals	NRT =	59
Percentage of decomposer individuals	%NRT =	54
Number of 'dry' decomposer taxa	SRD =	5

Percentage of 'dry'decomposer taxa	%SRD =	9
Number of 'dry' decomposer individuals	NRD =	18
Percentage of 'dry'decomposer individuals	%NRD =	17
Number of 'foul' decomposer taxa	SRF =	3
Percentage of 'foul' decomposer taxa	%SRF =	5
Number of 'foul' decomposer individuals	NRF =	14
Percentage of 'foul' decomposer individuals	%NRF =	13
Index of diversity of decomposer component	alpha RT =	11
Standard error	SE alpha RT =	2
Number of individuals of grain pests	NG =	13
Number of uncoded taxa	SU =	10
Percentage of uncoded individuals	PNU =	11

Site: OGLB82 Context: 229 Sample: 8/T - species list in rank order

Taxon	Number	%	Rank	Ecodes
Anotylus tetracarinatus (Block)	11	9	1	rt
Oryzaephilus surinamensis (Linnaeus)	9	7	2	g
Platystethus arenarius (Fourcroy)	6	5	3	rf
Lathridius minutus group	6	5	3	rd
Aphodius ?prodromus (Brahm)	5	4	5	ob rf
Ptinus fur (Linnaeus)	5	4	5	rd
Helophorus sp. B	4	3	7	oa w
Phyllopertha horticola (Linnaeus)	4	3	7	oa p
Anobium punctatum (Degeer)	4	3	7	l
Cercyon analis (Paykull)	3	2	10	rt
Cercyon haemorrhoidalis (Fabricius)	3	2	10	rf
Lesteva ?longoelytrata (Goeze)	3	2	10	oa d
Anotylus nitidulus (Gravenhorst)	3	2	10	rt d
Aleocharinae sp. D	3	2	10	u
Cryptophagus sp. A	3	2	10	rd
Cryptophagus sp. B	3	2	10	rd
Meligethes sp.	2	2	17	oa p
Cryptolestes ferrugineus (Stephens)	2	2	17	g
Corticaria sp. A	2	2	17	rt
Miridae sp.	1	1	20	oa p
Saldidae sp.	1	1	20	oa d
Nebria sp.	1	1	20	oa
Notiophilus sp.	1	1	20	oa
Bembidion sp.	1	1	20	oa
Carabidae sp. A	1	1	20	ob
Carabidae sp. B	1	1	20	ob
Carabidae sp. C	1	1	20	ob
Helophorus sp. A	1	1	20	oa w
Megasternum obscurum (Marsham)	1	1	20	rt
Onthophilus striatus (Forster)	1	1	20	rt
Ochthebius sp.	1	1	20	oa w
Micropeplus sp.	1	1	20	rt
Xylodromus concinnus (Marsham)	1	1	20	rt
Stenus sp. A	1	1	20	u
Stenus sp. B	1	1	20	u
Stenus sp. C	1	1	20	u
Euaesthetus sp.	1	1	20	oa
Philonthus sp. A	1	1	20	u
Philonthus sp. B	1	1	20	u

Tachinus ?signatus Gravenhorst	1	1	20	u
Cordalia obscura (Gravenhorst)	1	1	20	rt
Aleocharinae sp. A	1	1	20	u
Aleocharinae sp. B	1	1	20	u
Aleocharinae sp. C	1	1	20	u
Cyphon sp.	1	1	20	oa d
Elateridae sp.	1	1	20	ob
Lyctus linearis (Goeze)	1	1	20	l
Corticaria sp. B	1	1	20	rt
Corticarina or Cortinicara sp.	1	1	20	rt
Typhaea stercorea (Linnaeus)	1	1	20	rd
Palorus ratzeburgi (Wissman)	1	1	20	g
Anthicus floralis or formicarius	1	1	20	rt
Gastrophysa viridula (Degeer)	1	1	20	oa p
Longitarsus sp.	1	1	20	oa p
Apion sp.	1	1	20	oa p
Sitona sp.	1	1	20	oa p
Sitophilus granarius (Linnaeus)	1	1	20	g
Ceuthorhynchinae sp.	1	1	20	oa p
Mecinus pyraster (Herbst)	1	1	20	oa p
Scolytidae sp.	1	1	20	l

Site: OGLB82 Context: 290 Sample: 9/T - beetle/bug main statistics

Erosion = 3 Fragmentation = 3; Weight = 1.000kg

Number of individuals estimated as	N =	55
Number of taxa	S =	37
Index of diversity (alpha)	alpha =	50
Standard error of alpha	SE alpha =	14
Number of 'certain' outdoor taxa	SOA =	12
Percentage of 'certain' outdoor taxa	%SOA =	32
Number of 'certain' outdoor individuals	NOA =	12
Percentage of 'certain' outdoor individuals	%NOA =	22
Number of 'certain' and probable outdoor taxa	SOB =	15
Percentage of 'certain' and probable outdoor taxa	%SOB =	41
Number of 'certain' and probable outdoor individuals	NOB =	17
Percentage 'certain' and probable outdoor individuals	%NOB =	31
Diversity index for OB not calculated, NOB = SOB or NOB < 20		
Number of aquatic taxa	SW =	3
Percentage of aquatic taxa	%SW =	8
Number of aquatic individuals	NW =	3
Percentage of aquatic individuals	%NW =	5
Number of damp ground/waterside taxa	SD =	1
Percentage of damp ground/waterside taxa	%SD =	3
Number of damp ground/waterside individuals	ND =	11
Percentage of damp ground/waterside individuals	%ND =	20
Number of strongly plant-associated taxa	SP =	7
Percentage of strongly plant-associated taxa	%SP =	19
Number of strongly plant-associated individuals	NP =	7
Percentage of strongly plant-associated individuals	%NP =	13
Number of heathland/moorland taxa	SM =	1
Number of heathland/moorland individuals	NM =	1
Percentage of heathland/moorland individuals	%NM =	2
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 =	10
Percentage of decomposer taxa	%SRT =	27
Number of decomposer individuals	NRT =	26
Percentage of decomposer individuals	%NRT =	47
Number of 'dry' decomposer taxa	SRD =	3
Percentage of 'dry'decomposer taxa	%SRD =	8
Number of 'dry' decomposer individuals	NRD =	3
Percentage of 'dry'decomposer individuals	%NRD =	5
Number of 'foul' decomposer taxa	SRF =	3
Percentage of 'foul' decomposer taxa	%SRF =	8
Number of 'foul' decomposer individuals	NRF =	9
Percentage of 'foul' decomposer individuals	%NRF =	16
Index of diversity of decomposer component	alpha RT =	6
Standard error	SE alpha RT =	2
Number of individuals of grain pests	NG =	3
Percentage of individuals of grain pests	%NG =	5
Number of individuals of grain pests	NG =	3
Number of uncoded taxa	SU =	11
Percentage of uncoded individuals	PNU =	24

Site: OGLB82 Context: 290 Sample: 9/T - species list in rank order

Taxon	Number	%	Rank	Ecodes
Anotylus nitidulus (Gravenhorst)	11	20	1	rt d
Platystethus arenarius (Fourcroy)	5	9	2	rf
Aphodius sp.	3	5	3	ob rf
Philonthus or Gabrius sp.	2	4	4	u
Aleocharinae sp. A	2	4	4	u
Lyctocoris campestris (Fabricius)	1	2	6	rd
Ulopa reticulata (Fabricius)	1	2	6	oa p m
Conomelus anceps (Germar)	1	2	6	oa p
Bembidion (Philochthus) sp.	1	2	6	oa
Amara sp.	1	2	6	oa
?Lebiini sp.	1	2	6	u
Carabidae sp.	1	2	6	ob
Helophorus sp. A	1	2	6	oa w
Helophorus sp. B	1	2	6	oa w
Cercyon sp. A	1	2	6	u
Cercyon sp. B	1	2	6	u
Ochthebius sp.	1	2	6	oa w
Scydmaenidae sp.	1	2	6	u
Stenus sp.	1	2	6	u
Gyrohypnus sp.	1	2	6	rt
Xantholinus sp.	1	2	6	u
Philonthus sp.	1	2	6	u
Aleocharinae sp. B	1	2	6	u
Aleocharinae sp. C	1	2	6	u
Aphodius sp. B	1	2	6	ob rf
Phyllopertha horticola (Linnaeus)	1	2	6	oa p
Monotoma ?longicollis (Gyllenhall)	1	2	6	rt
Cryptolestes ferrugineus (Stephens)	1	2	6	g
Oryzaephilus surinamensis (Linnaeus)	1	2	6	g
Cryptophagus sp.	1	2	6	rd
Lathridius minutus group	1	2	6	rd

Corticarina or Cortinicara sp.	1	2	6	rt
Chrysolina sp.	1	2	6	oa p
?Gastrophysa viridula (Degeer)	1	2	6	oa p
Apion sp.	1	2	6	oa p
?Sitona sp.	1	2	6	oa p
Sitophilus granarius (Linnaeus)	1	2	6	g