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Assessment of invertebrate remains from 'tree pits' in Selby (site code SDC97)

by

John Carrott, Deborah Jaques, Harry Kenward and Darren Worthy

Summary

Six samples from medieval and post-medieval organic-rich deposits revealed during excavation of pits for tree-planting in central Selby have been investigated for invertebrate macrofossils. All contained at least some insect remains and a range of other invertebrates, and each deposit would yield an interpretatively useful assemblage from a subsample of 3-5 kg. Preservation was generally good. The deposits seem to have formed in the open, with dumping of organic waste, some perhaps domestic and some probably stable manure. Conditions seem to have been muddy and puddles may have existed from time to time. Further investigation is recommended.

Keywords: SELBY; MEDIEVAL; POST-MEDIEVAL; INVERTEBRATES; INSECTS; MUD; PUDDLES; STABLE MANURE; HOUSE FAUNA

Authors' address:

Environmental Archaeology Unit
University of York
Heslington
York YO10 5DD

Prepared for:

Alison Clarke
18 Ash Grove
Northallerton DL6 1RQ

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Introduction

A selection of samples from deposits of medieval to post-medieval date revealed during archaeological excavation of a series of pits for tree-planting in central Selby, North Yorkshire, was submitted to the EAU for assessment of invertebrate remains.

Methods

Samples from six contexts were examined for insect remains and other macro-invertebrates. Following a description (using a *pro-forma*), subsamples of the sediment were sieved to 300 microns and invertebrate remains extracted using paraffin flotation (Kenward *et al.* 1980, as modified by Kenward *et al.* 1986). Although this was an assessment it was considered worthwhile to record the assemblages in more detail than the usual 'assessment recording' in order to provide data for synthesis; two groups were 'scan recorded' and the remainder 'rapid-scan recorded' (*sensu* Kenward 1992). Data were entered to a PARADOX-based system which produces species lists and summary statistics for the assemblages.

Results

Species lists are given in rank order for each assemblage in Table 1, and main statistics for the assemblages of adult beetles and bugs in Table 2. The ecological and other codes employed are explained in Table 3.

Sample-by-sample account

The material is considered in context order. Information provided by the excavator is given in square brackets. Preservation of invertebrate remains was generally good.

Context 3326 [Occupation layer - ?leather working; black and brown organic silt containing large quantities of leather; pottery in 14th-17th century range]

Laboratory description: Moist, mid grey-brown brittle (working soft) slightly sandy clay silt, browner and greyer in patches, with a patch of coarse sand, stones (2-60 mm), tile, coal (to 25 mm), twigs, a large, well-preserved fragment of leather, and marine mollusc shell. Subsample of 1.6 kg processed.

Invertebrates: A substantial assemblage of invertebrate remains was recovered; the material was scan recorded. In addition to 109 individuals of 60 taxa of adult beetles and bugs there were abundant mites and smaller numbers of a range of other invertebrates, including three kinds of water-flea (Cladocera) resting eggs and an unidentified flea body segment.

The beetles were notable for the abundance of oxyteline staphylinids: the most numerous taxon was *Carpelimus pusillus* group (9 individuals), with *Anotylus nitidulus* (8), an unidentified *Carpelimus* (4), *C. ?bilineatus*, *Platystethus arenarius*, *P. degener* and *Anotylus tetracarinatus* (all 3), *P. alutaceus* and *P. nitens* (2 each), *C. ?rivularis* and *Oxytelus sculptus* (both 1). Most of these are species normally found in damp waterside litter and mud at the present day *(P. arenarius* and *O. sculptus* being associated with dung and artificial accumulations of foul matter, however). It might be argued that this characteristic group formed as a result of the accumulation of 'background fauna' since

these are all very migratory species (this was suggested by Kenward 1978, 7, for example). However, it seems likely that they bred in the 'muddy' organic-rich accumulating deposit at the present site, as has been suspected for some other sites, such as 5-7 Coppergate, York (Hall *et al.* 1983). Water beetles were fairly numerous but it is not clear whether they had colonised small pools or were accidental arrivals (i.e. background fauna). The water-flea resting eggs may indicate short-lived puddles, but could conceivably have resulted from the disposal of waste water or even have entered in animal dung (having been taken in accidentally while drinking).

The remaining fauna included a range of species which seem most likely to have originated in horse dung or scattered stable manure - the grain pests *Oryzaephilus surinamensis* and *Sitophilus granarius*, together with 'house fauna' components and small numbers of characteristic decomposers associated with open-textured foul matter (the recognition of stable manure is discussed by Kenward and Hall 1997).

This assemblage gives a strong impression of a damp, muddy area with much organic matter, probably stable manure, and no more than rare weeds.

Context 3452 [Brushwood or wattle fence; ... twigs and small branches, laid horizontally twisted round and laid against small ... upright stakes; pottery in 12th-16th century range]

Laboratory description: Just moist, mid grey-brown, brittle to crumbly (working soft), slightly sandy silt with dark grey and dark brown patches internally; clear content of well-decayed organic matter. Some very rotten wood and some fly puparia. Subsample of 0.95 kg processed; rapid-scan recorded.

Invertebrates: Rather few invertebrates were present, but there was a subjective affinity with the fauna recorded for the sample from Context 3326; oxyteline staphylinids (*Anotylus*, *Carpelimus* and *Platystethus* species) were prominent. This may have been largely background fauna, but it is possible that communities of beetles including the oxytelines exploited muddy conditions on surfaces. A much large subsample (5 kg or more) would produce an interpretatively useful assemblage.

Context 3639 [Layer; mottled mid to dark brown silt, woody with occasional stones (mainly small), shell and tile; pottery in 15th-16th century range]

Laboratory description: Just moist, light-mid grey-brown, brittle to crumbly (working soft when wet), slightly sandy slightly clay silt with an orange tinge in places. Brick/tile, ?vivianite, rotten organic matter and twigs were present. Subsample of 0.95 kg processed. Rapid-scan recorded.

Invertebrates: Modest numbers of remains were present. Grain pests were among the commonest beetles, but the fauna was very mixed, perhaps including a substantial background component. Two taxa associated with wood were present: the flatbug *Aneurus* sp. (found under loose bark) and the bark beetle ?*Leperisinus varius* (which bores in ash trunks and branches). A larger subsample (perhaps 5 kg) would provide an assemblage which would give a clearer view of conditions at the point of deposition.

Context 3657 [Layer; compacted dark grey-black organic silt with some wood and high percentage [of] cinder; pottery in 14th-15th century range]

Laboratory description: Dry, layered and crumbly (working soft when wet), humic slightly sandy silt, varicoloured from light grey-brown to mid grey-brown to mid to dark brown to black. Stones 20-60 mm and small fragments of mica present. Subsample of 0.65 kg processed. Rapid-scan recorded.

Invertebrates: A small group of invertebrates was recorded. The overall impression was that most of the fauna originated within a building, for a range of 'house fauna' taxa (*sensu* Kenward and Hall 1995, 662-667) was present. Notable among these were *Lathridius minutus* group (6 individuals), *Mycetaea hirta* and *Aglenus brunneus* (both 2), ?*Xylodromus concinnus*, *Tipnus unicolor*, *Cryptophagus* ?*scutellatus*, two *Atomaria* species, *Tenebrio* ?*obscurus* and the human flea *Pulex irritans* (all 1). The presence of *Oryzaephilus surinamensis* (2) and *Anthicus floralis* or *formicarius* (1) offers a hint (no more) that this deposit included stable manure, but it may have been house floor material. The sheep louse *Damalinia ovis* was recognised; it probably originated in wool cleaning (as discussed by Kenward and Hall 1995), but may conceivably have fallen from living beasts brought to market in the town. A larger subsample (of 3-5 kg) would undoubtedly provide an assemblage which would clarify the origin of the organic waste contributing to this deposit.

Context 3703 [Layer; very dark brown to black, very organic woody silt with occasional large stones; pottery of 14th-15th century date]

Laboratory description: Moist, mid to dark brown, brittle and layered (working soft), slightly sandy silt with fine and coarse herbaceous detritus. Some ?bark, wood, twigs and ?straw. The processed subsample weighed 0.8 kg.

Invertebrates: The assemblage was scan-recorded. There were 76 adult individuals of 43 beetle and bug taxa of the groups used in preparing assemblage statistics, together with numerous mites and fly puparia, and a range of other remains including a human flea (*Pulex irritans*). Grain pests were numerous (ten *Oryzaephilus surinamensis* and five *Sitophilus granarius*), and there was a clear house fauna component including *Lathridius minutus* group (10), *Mycetaea hirta* (3), *Ptinus* ?*fur* and *Cryptophagus* sp. (2 each) and single individuals of several other taxa. A hint of the presence of hay was offered by the stiltbug *Berytinus* sp. and the 'clover weevil' *Apion* sp., and perhaps by the click beetle *Agriotes* sp. (all single individuals). These three components rather suggest the presence of stable manure. There were a few decomposers associated with foul matter, and a trace of water flea resting eggs. A larger subsample (of 3-5 kg) would undoubtedly clarify the interpretation.

Context 3735 [Occupation layer; friable black clayey silt, fairly organic; pottery in 11th-15th century range]

Laboratory description: Just moist, mid grey-brown, somewhat layered and brittle to crumbly (working soft), sandy silt with fine herbaceous detritus. There were light brown sandy patches. Twigs and ?moss were noted. Subsample of 0.9 kg processed.

Invertebrates: A small group of remains was noted, with no clear ecological group predominant; a much larger subsample (at least 5 kg) would probably produce an interpretable group.

Discussion and recommendations

The deposits represented by the samples examined in this assessment clearly contain low to high concentrations of invertebrate remains, particularly insects, useful in archaeological interpretation. These remains indicate an outdoor area of accumulating waste, at times muddy and perhaps with short-lived pools. There seems to have been little vegetation nearby, suggesting very intensive disturbance. Stable manure was probably dumped, and domestic debris may have been present. There were some human fleas, and a single sheep louse, the latter probably shed during wool-cleaning.

It is recommended that further analysis should be carried out, both on the assessed samples and on a selection of additional ones, in order to determine the nature and origin of the organic component contributing to the build-up, the conditions in the surroundings, and the nature of human activity.

There can be no doubt that large-scale excavation of the area sampled in this exercise would reveal extensive deposits with good preservation by anoxic waterlogging; every effort should be made to conserve this resource, rather rare in small towns and invaluable both for reconstructing Selby's past and for comparison with settlements elsewhere. To judge from this and earlier evaluations and assessments, the town has immense potential for bioarchaeological investigations; it may prove to be on a par with York in this respect.

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Table 1. Species lists in rank order for invertebrate macrofossils from samples from Selby SDC97. For each sample assemblage the adult Hemiptera (bugs, excluding Aphidoidea and Coccidoidea) and Coleoptera (beetles) are listed first, followed by the remaining invertebrates. Weight is in kilogrammes; ec = ecological code(s); n = minimum number of individuals; sq = semi-quantitative (e = estimate; - = fully quantitative, m = 'many', translated as 15 individuals; s = 'several', translated as 6). ReM = recording method (S - scan; R - rapid scan; RS - semi-quantitative rapid scan, all sensu *Kenward 1992). For explanation of ecological codes, see Table 3. * = not used in calculating assemblage statistics (as given in Table 2). Token sample numbers have been derived from the context numbers of the samples to satisfy the requirements of the recording system. Nomenclature follows Kloet and Hincks (1964-77).*

Context: **3326** Sample: 332601/T ReM: S
Weight: 1.60 E: 0.00 F: 0.00

Taxon	**n**	**sq**	**ec**
Carpelimus pusillus group	9	-	u
Anotylus nitidulus	8	-	rt-d
Carpelimus sp.	4	-	u
Oryzaephilus surinamensis	4	-	g-ss
Lathridius minutus group	4	-	rd-st
Corticaria sp. D	4	-	rt-sf
Helophorus sp. C	3	-	oa-w
Carpelimus ?bilineatus	3	-	rt-sf
Platystethus arenarius	3	-	rf
Platystethus degener	3	-	oa-d
Anotylus tetracarinatus	3	-	rt
Anobium punctatum	3	-	l-sf
Platystethus alutaceus	2	-	oa-d
Platystethus nitens	2	-	oa-d
Xantholinus linearis or longiventris	2	-	rt-sf
Ptinus sp.	2	-	rd-sf
Cryptophagus sp. A	2	-	rd-sf
Cryptophagus sp. B	2	-	rd-sf
Mycetaea hirta	2	-	rd-ss
Corticaria sp. B	2	-	rt-sf
Corticaria sp. C	2	-	rt-sf
Sitophilus granarius	2	-	g-ss
Lygaeidae sp.	1	-	oa-p
Saldula sp.	1	-	oa-d
Trechus obtusus or quadristriatus	1	-	oa
Bembidion sp.	1	-	oa
Colymbetes fuscus	1	-	oa-w
Helophorus grandis	1	-	oa-w
Helophorus sp.	1	-	oa-w
Helophorus sp. A	1	-	oa-w
Helophorus sp. B	1	-	oa-w
Cercyon unipunctatus	1	-	rf-st
Ptenidium sp.	1	-	rt
Omalium sp.	1	-	rt
Xylodromus concinnus	1	-	rt-st
Carpelimus ?rivularis	1	-	ob-d
Oxytelus sculptus	1	-	rt-st
Stenus sp.	1	-	u
Gyrohypnus sp.	1	-	rt
Philonthus sp. A	1	-	u
Philonthus sp. B	1	-	u
Falagria or Cordalia sp.	1	-	rt-sf
Aleocharinae sp. A	1	-	u
Aleocharinae sp. B	1	-	u
Aleocharinae sp. C	1	-	u
Aleocharinae sp. E	1	-	u
Aleocharinae sp. F	1	-	u
Aphodius sp. A	1	-	ob-rf
Aphodius sp. B	1	-	ob-rf
Aphodius sp. C	1	-	ob-rf
Tipnus unicolor	1	-	rd-st
Monotoma sp.	1	-	rt-sf
Atomaria sp.	1	-	rd
Corticaria sp. A	1	-	rt-sf
Corticarina or Cortinicara sp.	1	-	rt
Anthicus floralis or formicarius	1	-	rt-st
Phyllotreta nemorum group	1	-	oa-p
Halticinae sp.	1	-	oa-p
Curculionidae sp.	1	-	oa
Coleoptera sp.	1	-	u
*Acarina sp.	15	m	u
*Hymenoptera Parasitica sp.	3	-	u
*Cladocera sp. (ephippium)	2	-	oa
*Cladocera sp. F (ephippium)	2	-	oa-w-
*Diptera sp. (pupa)	2	-	u
*Diptera sp. (puparium)	2	-	u
*Auchenorhyncha sp. (nymph)	1	-	oa-p
*Coleoptera sp. (larva)	1	-	u
*Daphnia sp. (ephippium)	1	-	oa-w
*Diptera sp. (adult)	1	-	u
*Oligochaeta sp. (egg capsule)	1	-	u
*Siphonaptera sp.	1	-	u
*Diptera sp. (larva)	1	-	u

Context: **3452** Sample: 345201/T ReM: R
Weight: 0.95 E: 0.00 F: 0.00

Taxon	n	sq	ec
Anotylus nitidulus	2	-	rt-d
Carpelimus bilineatus or rivularis	1	-	u
Platystethus degener	1	-	oa-d
Platystethus nitens	1	-	oa-d
Lathrobium sp.	1	-	u
Neobisnius sp.	1	-	u
Aleocharinae sp. A	1	-	u
Aleocharinae sp. B	1	-	u
Aphodius sp.	1	-	ob-rf
Anobium punctatum	1	-	l-sf
Oryzaephilus surinamensis	1	-	g-ss
*Diptera sp. (pupa)	1	-	u

Context: **3639** Sample: 363901/T CA: TP9 ReM: R
Weight: 0.95 E: 0.00 F: 0.00

Taxon	n	sq	ec
Oryzaephilus surinamensis	2	-	g-ss
Lathridius minutus group	2	-	rd-st
Sitophilus granarius	2	-	g-ss
Aneurus sp.	1	-	l
Loricera pilicornis	1	-	oa
Helophorus sp.	1	-	oa-w
Ochthebius sp.	1	-	oa-w
Omaliinae sp.	1	-	rt
Carpelimus pusillus group	1	-	u
Carpelimus sp.	1	-	u
Platystethus cornutus group	1	-	oa-d
Platystethus nitens	1	-	oa-d
Anotylus tetracarinatus	1	-	rt
Gyrohypnus sp.	1	-	rt
Neobisnius sp.	1	-	u
Staphylininae sp.	1	-	u
Tachinus ?subterraneus	1	-	u
Aleocharinae sp. A	1	-	u
Aleocharinae sp. B	1	-	u
Aleocharinae sp. C	1	-	u
Aleocharinae sp. D	1	-	u
Aphodius sp.	1	-	ob-rf
Corticaria sp.	1	-	rt-sf
Curculionidae sp.	1	-	oa
?Leperisinus varius	1	-	l
*Acarina sp.	6	s	u
*Aranae sp.	2	-	u
*Oligochaeta sp. (egg capsule)	1	-	u
*Diptera sp. (pupa)	1	-	u

Context: **3657** Sample: 365701/T ReM: RS
Weight: 0.65 E: 0.00 F: 0.00

Taxon	n	sq	ec
Lathridius minutus group	6	s	rd-st
Oryzaephilus surinamensis	2	-	g-ss
Mycetaea hirta	2	-	rd-ss
Aglenus brunneus	2	-	rt-ss
Sitophilus granarius	2	-	g-ss
Bembidion sp.	1	-	oa
Helophorus sp.	1	-	oa-w
Ochthebius sp.	1	-	oa-w
Micropeplus ?fulvus	1	-	rt
?Xylodromus concinnus	1	-	rt-st
Anotylus nitidulus	1	-	rt-d
Falagria sp.	1	-	rt-sf
Aphodius sp.	1	-	ob-rf
Tipnus unicolor	1	-	rd-st
Cryptophagus ?scutellatus	1	-	rd-st
Cryptophagus sp.	1	-	rd-sf
Atomaria sp. A	1	-	rd
Atomaria sp. B	1	-	rd
Corticaria sp.	1	-	rt-sf
Tenebrio ?obscurus	1	-	rt-ss
Anthicus floralis or formicarius	1	-	rt-st
Longitarsus sp.	1	-	oa-p
?Mecinus sp.	1	-	oa-p
*Acarina sp.	6	s	u
*Pulex irritans	1	-	ss
*Aranae sp.	1	-	u
*Damalinia ovis	1	-	u
*Daphnia sp. (ephippium)	1	-	oa-w

Context: **3703** Sample: 370301/T ReM: S
Weight: 0.80 E: 0.00 F: 0.00

Taxon	n	sq	ec
Oryzaephilus surinamensis	10	-	g-ss
Lathridius minutus group	10	-	rd-st
Sitophilus granarius	5	-	g-ss
Ptenidium sp.	3	-	rt
Platystethus ?degener	3	-	oa-d
Mycetaea hirta	3	-	rd-ss
Corticaria sp. A	3	-	rt-sf
Micropeplus fulvus	2	-	rt
Ptinus ?fur	2	-	rd-sf
Cryptophagus sp.	2	-	rd-sf
Berytinus sp.	1	-	oa-p
Helophorus sp.	1	-	oa-w
Cercyon analis	1	-	rt-sf
Cercyon haemorrhoidalis	1	-	rf-sf
Omalium ?rivulare	1	-	rt-sf
Omalium sp.	1	-	rt
Xylodromus ?concinnus	1	-	rt-st
Carpelimus sp.	1	-	u
Aploderus caelatus	1	-	rt

Platystethus arenarius	1	-	rf
Platystethus nitens	1	-	oa-d
Anotylus nitidulus	1	-	rt-d
Anotylus rugosus	1	-	rt
Lathrobium sp.	1	-	u
Quedius sp.	1	-	u
Tachyporus sp.	1	-	u
Cilea silphoides	1	-	rt-st
Cordalia obscura	1	-	rt-sf
Aleocharinae sp. A	1	-	u
Aleocharinae sp. B	1	-	u
Aleocharinae sp. C	1	-	u
Aphodius sp.	1	-	ob-rf
Agriotes sp.	1	-	oa-p
Anobium punctatum	1	-	l-sf
Tipnus unicolor	1	-	rd-st
Monotoma sp.	1	-	rt-sf
Corticaria sp. B	1	-	rt-sf
Corticariinae sp.	1	-	rt
Aglenus brunneus	1	-	rt-ss
Longitarsus sp.	1	-	oa-p
Halticinae sp.	1	-	oa-p
Apion sp.	1	-	oa-p
Coleoptera sp.	1	-	u
*Acarina sp.	15	m	u
*Diptera sp. (puparium)	15	m	u
*Hymenoptera Parasitica sp.	2	-	u
*Auchenorhyncha sp. (nymph)	1	-	oa-p
*Pulex irritans	1	-	ss
*Aphidoidea sp.	1	-	u
*Aranae sp.	1	-	u
*Bibionidae sp.	1	-	u
*Cladocera sp. (ephippium)	1	-	oa
*Daphnia sp. (ephippium)	1	-	oa-w
*Diptera sp. (adult)	1	-	u
*Pseudoscorpiones sp.	1	-	u

Context: **3735** Sample: 373501/T CA: TP4 ReM: R
Weight: 0.90 E: 0.00 F: 0.00

Taxon	**n**	**sq**	**ec**
Lathridius minutus group	2	-	rd-st
Dytiscidae sp.	1	-	oa-w
Helophorus sp.	1	-	oa-w
Cercyon terminatus	1	-	rf-st
Neobisnius sp.	1	-	u
Aphodius sp.	1	-	ob-rf
Anobium punctatum	1	-	l-sf
Monotoma sp.	1	-	rt-sf
Atomaria sp.	1	-	rd
Orthoperus sp.	1	-	rt
?Cis sp.	1	-	l
*Acarina sp.	6	s	u
*Daphnia sp. (ephippium)	1	-	oa-w
*Formicidae sp.	1	-	u
*Diptera sp. (puparium)	1	-	u

Table 2. Main statistics for assemblages of adult beetles and bugs (excluding aphids and scale insects) from samples from Selby SDC97. For explanation of abbreviations, see Table 3. Percentages rounded to nearest whole number. Zero values of the index of diversity indicate that it was not calculated because the number of individuals was too small (less than 20).

Context	**3326**	**3452**	**3639**	**3657**	**3703**	**3735**	Whole site
Sample	332601	345201	363901	365701	370301	373501	
Ext	/T	/T	/T	/T	/T	/T	
			TP9	TP11		TP4	
S	60	11	25	23	43	11	106
N	109	12	28	32	76	12	269
ALPHA	55	0	108	37	41	0	64
SEALPHA	9	0	63	14	9	0	6
SOB	20	3	7	6	9	3	31
PSOB	33	27	28	26	21	27	29
NOB	26	3	7	6	11	3	56
PNOB	24	25	25	19	14	25	21
ALPHAOB	41	0	0	0	0	0	29
SEALPHAOB	19	0	0	0	0	0	7
SW	6	0	2	2	1	2	8
PSW	10	0	8	9	2	18	8
NW	8	0	2	2	1	2	15
PNW	7	0	7	6	1	17	6
ALPHAW	0	0	0	0	0	0	0
SEALPHAW	0	0	0	0	0	0	0
SD	6	3	2	1	3	0	8
PSD	10	27	8	4	7	0	8
ND	17	4	2	1	5	0	29
PND	16	33	7	3	7	0	11
ALPHAD	0	0	0	0	0	0	4
SEALPHAD	0	0	0	0	0	0	1
SP	3	0	0	2	5	0	8
PSP	5	0	0	9	12	0	8
NP	3	0	0	2	5	0	10
PNP	3	0	0	6	7	0	4
ALPHAP	0	0	0	0	0	0	0
SEALPHAP	0	0	0	0	0	0	0
SM	0	0	0	0	0	0	0
PSM	0	0	0	0	0	0	0
NM	0	0	0	0	0	0	0
PNM	0	0	0	0	0	0	0
ALPHAM	0	0	0	0	0	0	0
SEALPHAM	0	0	0	0	0	0	0
SL	1	1	2	0	1	2	4
PSL	2	9	8	0	2	18	4
NL	3	1	2	0	1	2	9
PNL	3	8	7	0	1	17	3
ALPHAL	0	0	0	0	0	0	0
SEALPHAL	0	0	0	0	0	0	0
SRT	29	2	6	16	24	6	75
PSRT	48	18	24	70	56	55	71
NRT	55	3	7	23	42	7	137

Context	**3326**	**3452**	**3639**	**3657**	**3703**	**3735**	Whole site
PNRT	50	25	25	72	55	58	51
ALPHART	25	0	0	24	24	0	68
SEALPHART	6	0	0	11	7	0	10
SRD	7	0	1	7	5	2	22
PSRD	12	0	4	30	12	18	21
NRD	14	0	2	13	18	3	50
PNRD	13	0	7	41	24	25	19
ALPHARD	0	0	0	0	0	0	15
SEALPHARD	0	0	0	0	0	0	4
SRF	5	1	1	1	3	2	13
PSRF	8	9	4	4	7	18	12
NRF	7	1	1	1	3	2	15
PNRF	6	8	4	3	4	17	6
ALPHARF	0	0	0	0	0	0	0
SEALPHARF	0	0	0	0	0	0	0
SSA	21	2	4	13	18	4	36
PSSA	35	18	16	57	42	36	34
NSA	42	2	7	22	46	5	124
PNSA	39	17	25	69	61	42	46
ALPHASA	17	0	0	14	11	0	17
SEALPHASA	5	0	0	5	3	0	2
SSF	12	1	1	3	10	2	20
PSSF	20	9	4	13	23	18	19
NSF	25	1	1	3	14	2	46
PNSF	23	8	4	9	18	17	17
ALPHASF	9	0	0	0	0	0	14
SEALPHASF	3	0	0	0	0	0	3
SST	6	0	1	5	4	2	11
PSST	10	0	4	22	9	18	10
NST	9	0	2	10	13	3	37
PNST	8	0	7	31	17	25	14
ALPHAST	0	0	0	0	0	0	5
SEALPHAST	0	0	0	0	0	0	1
SSS	3	1	2	5	4	0	5
PSSS	5	9	8	22	9	0	5
NSS	8	1	4	9	19	0	41
PNSS	7	8	14	28	25	0	15
ALPHASS	0	0	0	0	0	0	2
SEALPHASS	0	0	0	0	0	0	0
SG	2	1	2	2	2	0	2
PSG	3	9	8	9	5	0	2
NG	6	1	4	4	15	0	30
PNG	6	8	14	13	20	0	11
ALPHAG	0	0	0	0	0	0	1
SEALPHAG	0	0	0	0	0	0	0

Table 3. Abbreviations for ecological codes and statistics used for interpretation of insect remains in text and tables. Lower case codes in parentheses are those assigned to taxa and used to calculate the group values (the codes in capitals). See Table 1 for codes assigned to taxa from Selby SDC97. Indivs - individuals (based on MNI); No - number.

No taxa	S
Estimated number of indivs (MNI)	N
Index of diversity (α)	ALPHA
Standard error of alpha	SE ALPHA
No 'certain' outdoor taxa (oa)	SOA
Percentage of 'certain' outdoor taxa	PSOA
No 'certain' outdoor indivs	NOA
Percentage of 'certain' outdoor indivs	PNOA
No OA and probable outdoor taxa (oa+ob)	SOB
Percentage of OB taxa	PSOB
No OB indivs	NOB
Percentage OB indivs	PNOB
Index of diversity of the OB component	ALPHAOB
Standard error	SEALPHAOB
No aquatic taxa (w)	SW
Percentage of aquatic taxa	PSW
No aquatic indivs	NW
Percentage of W indivs	PNW
Index of diversity of the W component	ALPHAW
Standard error	SEALPHAW
No damp ground/waterside taxa (d)	SD
Percentage D taxa	PSD
No damp D indivs	ND
Percentage of D indivs	PND
Index of diversity of the D component	ALPHAD
Standard error	SEALPHAD
No strongly plant-associated taxa (p)	SP
Percentage of P taxa	PSP
No strongly P indivs	NP
Percentage of P indivs	PNP
Index of diversity of the P component	ALPHAP
Standard error	SEALPHAP
No heathland/moorland taxa (m)	SM
Percentage of M taxa	PSM
No M indivs	NM
Percentage of M indivs	PNM
Index of diversity of the M component	ALPHAM
Standard error	SEALPHAM
No wood-associated taxa (l)	SL
Percentage of L taxa	PSL
No L indivs	NL
Percentage of L indivs	PNL
Index of diversity of the L component	ALPHAL
Standard error	SEALPHAL
No indivs of grain pests (g)	NG
Percentage of indivs of grain pests	PNG
No decomposer taxa (rt + rd + rf)	SRT
Percentage of RT taxa	PSRT
No RT indivs	NRT
Percentage of RT indivs	PNRT
Index of diversity of RT component	ALPHART
Standard error	SEALPHART
No 'dry' decomposer taxa (rd)	SRD
Percentage of RD taxa	PSRD
No RD indivs	NRD
Percentage of RD indivs	PNRD
Index of diversity of the RD component	ALPHARD
Standard error	SEALPHARD
No 'foul' decomposer taxa (rf)	SRF
Percentage of RF taxa	PSRF
No RF indivs	NRF
Percentage of RF indivs	PNRF
Index of diversity of the RF component	ALPHARF
Standard error	SEALPHARF
No synanthropic taxa (sf + st + ss)	SSA
Percentage of synanthropic taxa	PSSA
No synanthropic indivs	NSA
Percentage of SA indivs	PNSA
Index of diversity of SA component	ALPHASA
Standard error	SEALPHASA
No facultatively synanthropic indivs	SSF
Percentage of SF taxa	PSSF
No SF indivs	NSF
Percentage of SF indivs	PNSF
Index of diversity of SF component	ALPHASF
Standard error	SEALPHASF
No typical synanthropic indivs	SST
Percentage of ST taxa	PSST
No ST indivs	NST
Percentage of ST indivs	PNST
Index of diversity of ST component	ALPHAST
Standard error	SEALPHAST
No strongly synanthropic taxa	SSS
Percentage of SS taxa	PSSS
No SS indivs	NSS
Percentage of SS indivs	PNSS
Index of diversity of SS component	ALPHASS
Standard error	SEALPHASS
No uncoded taxa (u)	SU
Percentage of uncoded indivs	PNU