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**Plant and invertebrate remains from two
fill contexts from a Romano-British pit
at Glebe Farm, Barton-upon-Humber
S. Humberside (site code GFA92)**

by

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Summary

Two large samples of sediment from a large pit of mid-late fourth century AD date at the Glebe Farm site, near Barton-upon-Humber, S. Humberside, were examined for their content of insect and plant macrofossils. The pit, which had a free-standing plank structure at its base, appears to have contained open water and to have infilled gradually. There was only limited evidence of human occupation. It is speculated that this structure functioned as a crude well.

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Introduction

Three samples of the fills of a mid-late 4th century AD timber-lined pit (148) from excavations at Glebe Farm were examined for their content of plant and animal remains as part of a site evaluation for Humberside Archaeology Unit in 1992 (Dainton *et al.* 1992). They proved to contain well preserved but rather sparse remains and a more thorough investigation was deemed appropriate—in particular, because the feature had similarities to some other 'well-like' pits with linings which were not apparently in contact with the walls. In view of the low concentration of fossils, it was considered necessary to process larger quantities of sediment than normal. The material examined was from context 374 (from within a structure of three planks set on their sides in a rectangular formation) and 357 (from above this).

Methods

Most of the sediment available for the samples was processed following methods of Kenward *et al.* (1980) as modified by Kenward *et al.* (1986): for the combined samples 376 and 377 from context 374 a total of 45 kg was processed, and for sample 364 from context 357, 7 kg was treated. The sediment was described during the earlier phase of work as light/mid grey-brown, wet, soft, plastic, sticky sandy clay to clay sand, with traces of stones 6-20 mm, charcoal and fine (mm-scale) chalk (context 374) and light grey-brown (mottled greyer and browner on mm-scale), moist, plastic to slightly sticky, sandy clay with a trace of fine rootlets, stones 2-6 mm, modest amounts of charcoal (in patches) and patches of very rotted wood (context 377).

Plant remains were recorded by scanning the flots and residues and fossils were recorded on a four-point scale of abundance (Table 1), along with some other components. Some statistics for the assemblages are given in Table 2 (the groups and AIVs are explained in Hall and Kenward, 1990).

Parasite eggs were tested for in a 'squash' from sample 377. Molluscs were recovered during recording of plant remains.

Other invertebrates, particularly insects, were studied in the paraffin flots, remains of beetles and bugs being picked out onto damp filter paper for identification. Project constraints meant that there was not time to identify some of the less common or taxonomically more difficult remains.

Results

A full list of plant taxa from the two samples is given in Table 3; molluscs are listed in Table 4, and insects appear in Table 5. For interpretation, 'main statistics' of the assemblage of adult beetles and bugs were generated (Table 6).

The 45 kg subsample from samples 376 and 377 combined yielded 65 plant taxa and a very large assemblage of insects. The plant assemblage was dominated by annual nitrophile weeds (group CHEN, 52% of taxa, with a very large AIV of 69), with weeds of other groups (cornfield weeds, SECA; biennial/perennial nitrophiles, ARTE; nitrophiles of wet ground, BIDE; and trampled ground weeds, PLAN) making up the next four best-represented vegetation groups. There was a small component of waterside and damp ground plants, all in small numbers (in marked contrast to the insect remains, see below), and a few plants likely to have originated in human occupation, notably some small (?wild) plum stones (*Prunus domestica* ssp. *insititia*), apple pips (*Malus sylvestris*), coriander (*Coriandrum sativum*), charred bread/club wheat (*Triticum aestivo-compactum*) grains and, perhaps the first fossil record for Britain, a single nutlet of balm, *Melissa officinalis*. Apart from plumstone fragments (scored at 2-moderate amounts), all of these taxa were present in very small numbers.

There were 796 individuals of 233 taxa of adult beetles and bugs of the groups used for the calculation of assemblage statistics. The concentration of these remains was, however, not very high (17.7 individuals per kg). There were various other invertebrates, including of the order of 100 cladoceran ephippia (perhaps a *Daphnia* species), ostracod valves of several kinds, and fly larval head capsules. Among the less frequent remains were 'many' *Daphnia* sp. ephippia, bibionid flies, mites and Hymenoptera Parasitica, and 'several' *Myrmica* sp. ants, aphids, adult flies other than Bibionidae, earthworm egg capsules and ephippia of a third cladoceran.

The adult beetle and bug assemblage was very diverse ($\alpha = 111$; SE = 6), and over half of it consisted of 'outdoor' species (% N OB = 54). The outdoor component was of moderate diversity (α OB = 60; SE = 5); this value suggests a rich mixture of local and autochthonous communities rather than randomly accumulated 'background fauna'. Aquatics were numerous, with 28 taxa and 208 individuals (% N W = 26), damp ground/marginal species accounting for a further 10% of the fauna. The large size of the aquatic component allows an estimate of alpha to be made for it: α W = 9; SE = 1. This confirms what is intuitively obvious by inspection of the number of taxa in relation to number of individuals—that a vigorous breeding community of aquatics was present. Among these, *Ochthebius minimus* (with 48 individuals), *Tanysphyrus lemnae* (24), *Ochthebius ?viridis* (22), *Helophorus* sp. B and *Ochthebius ?dilatatus* (both 18), *Helophorus* sp. A ((16), an unidentified hydroporine (8), *Limnebius* sp (7), *Helophorus grandis*, *Hydrobius fuscipes* and *Ephistemus globulus* (all 6) were the most numerous. Most of these might be found together in a pool of reasonably clean, weedy water. *Ochthebius minimus* is found in stagnant water, usually ponds, and typically in mud. *O. dilatatus* is also typically associated with muddy water, but *O. viridis* is confined to brackish water and heath pools. *T. lemnae* is associated with duckweeds, which were presumably abundant to support a substantial population.

Species likely to have lived at the margin of this body of water include *Lesteva longoelytrata* (20), *Platystethus nitens* (16), *P. degener* (6) and *Carpelimus rivularis* (5). All of these may have exploited organic-rich mud and litter. Some other taxa may also have in litter by the water's edge, but may also have been components of a more terrestrial decomposer community in habitats created by human activity: notably *Carpelimus bilineatus* (with 50 individuals, the most abundant species), *Anotylus nitidulus* (27) and *Anotylus rugosus* (11). On balance, these probably *did* live in the pit. Although many of the recorded taxa are frequently found in synanthropic habitats, all might be found in nature in lowland Britain, and evidence of human occupation was extremely limited. On the other hand, there was little evidence of undisturbed natural habitats, and the terrestrial outdoor forms and decomposers may all have occurred in semi-natural habitats, such as are found in agricultural land not subjected to intensive farming. A substantial group of plant-feeders suggests that herb communities such as those of hayfields or weedy cultivated ground existed nearby. The ground beetles would have been at home in such situations. Trees were not an important feature of the nearby landscape, to judge from the insects: no taxa associated with trees were identified to species apart from two bark beetles which may have emerged from poles or posts rather than from dead trees or branches *in situ*.

Although some of the more abundant taxa belonged to decomposer communities, the proportion of coded decomposers (rt, rd, rf) was small: % N RT = 33. Addition of probable decomposers coded 'u' would raise this value only a little. There were moderate numbers of decomposers typically associated with rather dry habitats (% N RD = 7) but all of these may have lived in natural litter. There was limited evidence for the presence of dung or other foul habitats (% N RF = 4); in this group there were nine *Aphodius ?prodromus* and five *Cercyon terminatus* and *Platystethus arenarius*. Certainly these (and the other taxa of similar habitats) do not stand as evidence of accumulations of foul matter in the immediate vicinity, or of large quantities of herbivore dung.

The small assemblage of snails included abundant *Lymnaea truncatula*, indicative of the presence of a body of stagnant water. The remaining taxa, present in small numbers, were terrestrial and rather catholic, although perhaps favoured by damp ground.

No parasite eggs were observed in the 'squash' from sample 377.

The plant and insect remains from sample 364 (from the deposit above the timbers surrounding context 374), appeared to be essentially the same as those from 376+377 though the smaller sample size meant that shorter lists of taxa were obtained; it was considered to of no value to record the insects in detail.

Discussion

The paucity of plant remains from taxa found in aquatic environments can perhaps best be explained by the small scale of the feature and its probable isolation from other bodies of water. The pit did, undoubtedly, hold water, and, indeed, may have been a shallow well or watering hole. Biological remains from pits with a wood or wicker insert which was clearly separated from the pit cut by a space, have been studied previously from excavations of Romano-British deposits at North Cave, North Humberside (Allison *et al.*

1990) and from an Anglian feature in the area to the south of the site at 16-22 Coppergate, York (Hall *et al.* 1992). In both of the examples, the deposits within and outside the 'lining' proved to be essentially similar, indicating probable gradual deposition into open water. Both may have been shallow wells, the North Cave feature apparently being associated with a spring and the Coppergate pit lying towards the bottom of the slope running down to the River Foss. The pit at Glebe Farm may have had a similar function, although in this case fills were available for examination only from within the 'lining'. It may be that this type of pit served as a very simple way of obtaining clean water, the lining acting as a barrier to loose soil and the activities of stock at the edge of the pit. Such a barrier would provide a source of water for humans (within) and livestock (at the edges) without the conflict consequent on the use of a single basin for both purposes. In none of the cases mentioned here, however, were there large numbers of dung beetles to suggest that the pits *were* watering-holes; the Glebe Farm example gave modest numbers of *Aphodius* and a few other taxa associated with dung but these may possibly have entered as part of a long-travelled 'background' fauna. Evidence from other sites (e.g. Wilsford Shaft, Wiltshire, Osborne 1969) shows that when grazing animals were present the number of dung beetles entering the deposits could be immensely large and that they could form a substantial part of the resultant death assemblage.

The abundance of *Ochthebius ?viridis* in the large sample from Glebe Farm (there is little reason to doubt the identification) is surprising. However, this water beetle of brackish and heathland pools probably found habitats along the shores of the Humber, less than a mile to the north at present and perhaps somewhat closer in the past. *O. viridis* may have been able to establish itself in the pit at least temporarily by invading from nearby saline habitats. There was no distinctive component of heathland or brackish water plants to accompany these beetles.

This study has provided useful assemblages of biological remains both for archaeological interpretation and for compilation of records of species in space and time.

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Appendix

Table 1. Plant remains from samples 364 and 376+7 from Glebe Farm, Barton-upon-Humber (GFA92)

Context 357	Sample 364/+		
<hr style="border-top: 1px dashed black;"/>			
Salix sp(p). (b)	1	cf. Vicia sp(p).	1
Urtica dioica	2	Malva sylvestris	1
Urtica urens	1	Hypericum sp(p).	1
Polygonum aviculare agg.	1	Viola sp(p).	1
Beta vulgaris (fr fgts)	1	Hydrocotyle vulgaris	1
Chenopodium polyspermum	1	Coriandrum sativum	1
Chenopodium album	2	Oenanthe sp(p).	1
Atriplex sp(p).	2	Oenanthe lachenalii	1
Stellaria media	2	Aethusa cynapium	1
Ranunculus Section Ranunculus	1	Conium maculatum	1
Fumaria sp(p).	1	Pastinaca sativa	1
Capsella bursa-pastoris	1	cf. Daucus carota	1
Coronopus squamatus (fr)	1	Galeopsis Subgenus Galeopsis	1
Rubus fruticosus agg.	1	Lamium Section Lamiopsis	1
Rosa sp(p). (prickles)	1	Prunella vulgaris	1
Malva sylvestris	1	Melissa officinalis	1
Coriandrum sativum	1	Hyoscyamus niger	1
Oenanthe lachenalii	1	Solanum cf. dulcamara	1
Aethusa cynapium	1	Odontites verna	1
cf. Daucus carota	1	Plantago major	2
Gramineae	1	Sambucus nigra	1
Scirpus lacustris sl	2	Carduus/Cirsium sp(p).	1
Eleocharis palustris sl	1	Sonchus asper	1
		Baldellia ranunculoides	1
Daphnia (ephippia)	2	Juncus compressus/gerardi	1
charcoal	1	Juncus cf. articulatus	1
coal	1	Gramineae	1
ostracods	1	Gramineae (c/n)	1
sand	2	Triticum aestivo-compactum	1
snails	1	cf. Hordeum sp(p).	1
stones	2	Scirpus lacustris sl	1
twig fgts	1	Eleocharis palustris sl	1
wood fgts	1	Carex sp(p).	1
		?daub	1
		Daphnia (ephippia)	2
		charcoal	1
		coal	2
		dicot lf fgts	1
		earthworm egg caps	1
		ostracods	2
		snails	2
		twig fgts	1
		wood fgts	2
<hr style="border-top: 1px dashed black;"/>			
Context 374	Sample 376+377/+		
<hr style="border-top: 1px dashed black;"/>			
Pteridium aquilinum (pinn fgts)	1		
Salix sp(p). (fr)	1		
Salix sp(p). (b)	1		
Populus sp(p). (b/bs)	1		
Urtica dioica	3		
Urtica urens	1		
Polygonum aviculare agg.	1		
Polygonum persicaria	1		
Rumex sp(p).	1		
Rumex acetosella agg.	1		
Beta vulgaris	2		
Chenopodium Section Pseudoblitum	2		
Chenopodium polyspermum	2		
Chenopodium album	1		
Atriplex sp(p).	2		
Stellaria media	3		
Stellaria cf. neglecta	1		
Cerastium sp(p).	1		
Ranunculus Section Ranunculus	1		
Ranunculus sardous	1		
Ranunculus Subgenus Batrachium	1		
Papaver cf. rhoeas	1		
Papaver argemone	1		
Fumaria sp(p).	1		
Capsella bursa-pastoris	1		
Thlaspi arvense	1		
Coronopus squamatus (fr)	2		
Brassica rapa	1		
Rubus fruticosus agg.	1		
Crataegus monogyna	1		
Prunus domestica ssp. insititia	1		
Prunus domestica ssp. insititia (fgts)	2		

Table 2. Plant remains from samples 364 and 376+7 from Glebe Farm, Barton-upon-Humber (GFA92)

Context	357	Sample 364/+	Number of taxa 23		Vegetation			
	Group	Number of taxa	%taxa	AIV				
Uses	FOOS	2	9	4	CHEN	27	42	69
	FOOF	1	4	3	SECA	12	18	27
	WOOD	1	4	1	ARTE	13	20	25
Vegetation	CHEN	12	52	32	BIDE	6	9	23
	PHRA	4	17	11	PLAN	6	9	21
	SECA	5	22	11	MOAR	9	14	18
	ARTE	5	22	10	QUFA	7	11	16
	BIDE	3	13	10	RHPR	5	8	14
	PLAN	3	13	8	PHRA	7	11	13
	QUFA	3	13	7	EPIL	3	5	10
	CAKI	2	9	6	CAKI	3	5	9
	RHPR	2	9	6	NACA	4	6	8
	MOAR	3	13	5	ALNE	2	3	7
	ALNE	1	4	4	FEBR	3	5	5
	BULB	2	9	4	LITT	2	3	4
	EPIL	1	4	4	BULB	2	3	3
	FEBR	2	9	3	ISNA	2	3	3
	NACA	1	4	2	POTA	1	2	3
	TRGE	1	4	1	QUER	1	2	2
Unclassified	UNCL	2	9	2	SCCA	1	2	2
					SESC	1	2	2
					VAPI	1	2	2
					MOCA	1	2	1
					TRGE	1	2	1
					Ecology			
					FUGE	1	2	1
					Unclassified			
					UNCL	11	17	0

Context 374 Sample 376+377 Number of taxa 65

	Group	Number of taxa	%taxa	AIV
Uses	FOOS	8	12	22
	FOOF	2	3	6
	HERB	1	2	3
	WOOD	3	5	3
	USEF	1	2	2
	FOOO	1	2	1

Table 3. List of plant taxa recorded from samples 364 and 376+7 from Glebe Farm, Barton-upon-Humber (GFA92). Parts of plant recorded are seeds or fruits unless specifically marked otherwise.

Vascular plants

- Pteridium aquilinum* (L.) Kuhn (bracken)
Salix sp(p). (willow)
Populus sp(p). (poplar/aspen)
Urtica dioica L. (stinging nettle)
U. urens L. (annual nettle)
Polygonum aviculare agg. (knotgrass)
P. persicaria L. (persicaria/red shank)
Rumex sp(p). (docks)
R. acetosella agg. (sheep's sorrel)
Beta vulgaris L. (beet)
Chenopodium Section *Pseudoblitum* (red goosefoot etc.)
C. polyspermum L. (all-seed)
C. album L. (fat hen)
Atriplex sp(p). (oraches)
Stellaria media (L.) Vill. (chickweed)
S. cf. *neglecta* Weihe in Bluff & Fingerh. (?greater chickweed)
Cerastium sp(p). (mouse-ear chickweeds)
Ranunculus Section *Ranunculus* (meadow/creeping/bulbous buttercup)
R. sardous Crantz (airy buttercup)
R. Subgenus *Batrachium* (water crowfoots)
Papaver cf. *rhoeas* L. (?field poppy)
P. argemone L. (long prickly-headed poppy)
Fumaria sp(p). (fumitories)
Capsella bursa-pastoris (L.) Medicus (shepherd's purse)
Thlaspi arvense L. (field penny-cress)
Coronopus squamatus (Forskål) Ascherson (swine-cress)
Brassica rapa L. (turnip)
Rubus fruticosus agg. (blackberry/bramble)
Rosa sp(p). (roses)
Crataegus monogyna Jacq. (hawthorn)
Prunus domestica ssp. *insititia* (L.) C. K. Schneider (plums, etc.)
- cf. *Vicia* sp(p). (?vetches, etc.)
Malva sylvestris L. (common mallow)
Hypericum sp(p). (St John's-worts)
Viola sp(p). (violets/pansies, etc.)
Hydrocotyle vulgaris L. (marsh pennywort)
Coriandrum sativum L. (coriander)
Oenanthe sp(p). (water-dropworts)
Oe. lachenalii C. G. Gmelin (parsley water-dropwort)
Aethusa cynapium L. (fool's parsley)
Conium maculatum L. (hemlock)
Pastinaca sativa L. (wild parsnip)
 cf. *Daucus carota* L. (?wild carrot)
Galeopsis Subgenus *Galeopsis* (hemp-nettles)
Lamium Section *Lamiopsis* (annual dead-nettles)
Prunella vulgaris L. (selfheal)
Melissa officinalis L. (lemon balm)
Hyoscyamus niger L. (henbane)
Solanum cf. *dulcamara* L. (?woody nightshade)
Odontites verna (Bellardi) Dumort. (red bartsia)
Plantago major L. (greater plantain)
Sambucus nigra L. (elder)
Carduus/Cirsium sp(p). (thistles)
Sonchus asper (L.) Hill (prickly sow-thistle)
Baldellia ranunculoides (L.) Parl. (lesser water-plantain)
Juncus compressus/gerardi (round-fruited/saltmarsh rush)
J. cf. *articulatus* L. (?jointed rush)
 Gramineae (grasses)
Triticum aestivo-compactum (bread/club wheat)
 cf. *Hordeum* sp(p). (?barley)
Scirpus lacustris sensu lato (bulrush)
Eleocharis palustris sensu lato (common spike-rush)
Carex sp(p). (sedges)

Table 4. Molluscs from samples 364 and 376+7 from Glebe Farm, Barton-upon-Humber (GFA92) (Key: + - a few; ++ - several; +++ - many)

	364	376/7
<i>Lymnaea truncatula</i> (Müller)	+	+++
<i>Trichia hispida</i> (Linnaeus)	-	++
<i>Discus rotundatus</i> (Müller)	-	++
<i>Cochlicopa lubrica</i> (Müller)	-	++
<i>Vallonia costata</i> (Müller) (perhaps modern)	-	1

Table 5. List (in rank order) of adult beetles and bugs from sample 376+377 from Glebe Farm, Barton-upon-Humber (GFA92)

Taxon	Number	%	Rank	Ecodes
Carpelimus bilineatus Stephens	50	6	1	rt
Ochthebius minimus (Fabricius)	48	6	2	oa w
Aleocharinae sp. C	29	4	3	u
Anotylus nitidulus (Gravenhorst)	27	3	4	rt d
Tanysphyrus lemnae (Paykull)	24	3	5	oa w p
Ochthebius ?viridis Peyron	22	3	6	oa w
Lesteva longoelytrata (Goeze)	20	3	7	oa d
Helophorus sp. B	18	2	8	oa w
Ochthebius ?dilatatus Stephens	18	2	8	oa w
Helophorus sp. A	16	2	10	oa w
Platystethus nitens (Sahlberg)	16	2	10	oa d
Lathridius minutus group	12	2	12	rd
Anotylus rugosus (Fabricius)	11	1	13	rt
Aleocharinae sp. A	11	1	13	u
Atomaria sp. B	11	1	13	rd
Apion (Protapion) sp. B	11	1	13	oa p
Xantholinus linearis group	10	1	17	rt
Aphodius ?prodromus (Brahm)	9	1	18	ob rf
Corticarina sp.	9	1	18	rt
Hydroporinae sp. G	8	1	20	oa w
Megasternum obscurum (Marsham)	8	1	20	rt
Trechus quadristriatus (Schrank)	7	1	22	oa
Limnebius sp.	7	1	22	oa w
Atomaria sp. C	7	1	22	rd
Anthocoris sp.	6	1	25	oa p
Helophorus grandis Illiger	6	1	25	oa w
Hydrobius fuscipes (Linnaeus)	6	1	25	oa w
Platystethus degener Mulsant & Rey	6	1	25	oa d
Anobium punctatum (Degeer)	6	1	25	l
Ephistemus globulus (Paykull)	6	1	25	rd
Scolopostethus sp.	5	1	31	oa p
Bradycellus sp. A	5	1	31	oa p
Hydroporinae sp. F	5	1	31	oa w
Agabus bipustulatus (Linnaeus)	5	1	31	oa w
Cercyon terminatus (Marsham)	5	1	31	rf
Carpelimus rivularis (Motschulsky)	5	1	31	ob d
Platystethus arenarius (Fourcroy)	5	1	31	rf
Cordalia obscura (Gravenhorst)	5	1	31	rt
Meligethes sp. A	5	1	31	oa p
Atomaria sp. D	5	1	31	rd
Phyllotreta sp. B	5	1	31	oa p
Sitona ?lineatus (Linnaeus)	5	1	31	oa p
?Agallia sp.	4	1	43	oa p
Omalium sp. A	4	1	43	rt
Anotylus sculpturatus group	4	1	43	rt
Oxytelus sculptus Gravenhorst	4	1	43	rt
Tachyporus nitidulus (Fabricius)	4	1	43	u
Aleocharinae sp. B	4	1	43	u
Aleocharinae sp. E	4	1	43	u
Stegobium paniceum (Linnaeus)	4	1	43	rd
Meligethes sp. B	4	1	43	oa p
Phyllotreta nemorum group	4	1	43	oa p
Apion (Oxystoma) subulatum Kirby	4	1	43	oa p
Hydroporinae sp. E	3	0	54	oa w
Hydrophilinae sp. A	3	0	54	oa w
Leptacinus ?pusillus (Stephens)	3	0	54	rt
Tachyporus ?hypnorum (Fabricius)	3	0	54	u
Aleocharinae sp. D	3	0	54	u
Aleocharinae sp. G	3	0	54	u
Aleocharinae sp. J	3	0	54	u
Aphodius granarius (Linnaeus)	3	0	54	ob rf
Oxyomus sylvestris (Scopoli)	3	0	54	rt
Ptinus fur (Linnaeus)	3	0	54	rd

?Sericoderus lateralis (Gyllenhal)	3	0	54	rt
Enicmus sp.	3	0	54	rt
Corticaria sp. C	3	0	54	rt
Phyllotreta sp. C	3	0	54	oa p
Chaetocnema concinna (Marsham)	3	0	54	oa p
Temnostethus ?gracilis (Horvath)	2	0	69	oa
Anthocoris ?confusus Reuter	2	0	69	oa p
?Orius sp.	2	0	69	oa p
Saldula ?saltatoria (Linnaeus)	2	0	69	oa d
Auchenorhyncha sp. F	2	0	69	oa p
Clivina ?fossor (Linnaeus)	2	0	69	oa
Bembidion biguttatum (Fabricius)	2	0	69	oa d
Bembidion (Philochthus) sp.	2	0	69	oa
Hydroporinae sp. C	2	0	69	oa w
Hydroporinae sp. D	2	0	69	oa w
Hydroporinae sp. H	2	0	69	oa w
Helophorus aquaticus (Linnaeus)	2	0	69	oa w
Cercyon analis (Paykull)	2	0	69	rt
Cercyon unipunctatus (Linnaeus)	2	0	69	rf
Cymbiodyta marginella (Fabricius)	2	0	69	oa w
Metopsia retusa (Stephens)	2	0	69	u
Omalius sp. C	2	0	69	rt
Xylodromus concinnus (Marsham)	2	0	69	rt
Anotylus complanatus (Erichson)	2	0	69	rt
Stenus sp. C	2	0	69	u
Lathrobium sp. A	2	0	69	u
Othius myrmecophilus Kiesenwetter	2	0	69	rt
?Neobisnius sp.	2	0	69	u
Philonthus sp. C	2	0	69	u
Gabrius sp.	2	0	69	rt
Tachinus ?signatus Gravenhorst	2	0	69	u
Aleochara sp.	2	0	69	u
Aleocharinae sp. F	2	0	69	u
Aphodius sp.	2	0	69	ob rf
Cyphon sp.	2	0	69	oa d
Cryptophagus sp. A	2	0	69	rd
Cryptophagus sp. B	2	0	69	rd
Orthoperus sp. A	2	0	69	rt
Stephostethus lardarius (Degeer)	2	0	69	rt
Cortinicara gibbosa (Herbst)	2	0	69	rt
Longitarsus sp.	2	0	69	oa p
Sitona sp.	2	0	69	oa p
Pentatomidae sp.	1	0	106	oa p
Heterogaster urticae (Fabricius)	1	0	106	oa p
Peritrechus sp.	1	0	106	oa p
Loricula pselaphiformis Curtis	1	0	106	oa l
Orthops ?campestris (Linnaeus)	1	0	106	oa p
Miridae sp.	1	0	106	oa p
Chartoscirta ?cincta (Herrich-Schaeffer)	1	0	106	oa w
Corixidae sp.	1	0	106	oa w
Heteroptera sp.	1	0	106	u
Neophilaenus campestris (Fallen)	1	0	106	oa p
Auchenorhyncha sp. A	1	0	106	oa p
Auchenorhyncha sp. B	1	0	106	oa p
Auchenorhyncha sp. C	1	0	106	oa p
Auchenorhyncha sp. D	1	0	106	oa p
Auchenorhyncha sp. E	1	0	106	oa p
Auchenorhyncha sp. G	1	0	106	oa p
Carabus violaceus Linnaeus	1	0	106	oa
Nebria brevicollis (Fabricius)	1	0	106	oa
Notiophilus sp.	1	0	106	oa
Dyschirius sp.	1	0	106	oa
Bembidion genei Kuster	1	0	106	oa d
Bembidion doris (Panzer)	1	0	106	oa d
Bembidion guttula or mannerheimi	1	0	106	oa
Bembidion sp.	1	0	106	oa
Stomis pumicatus (Panzer)	1	0	106	oa
Pterostichus ?melanarius (Illiger)	1	0	106	ob
Pterostichus strenuus (Panzer)	1	0	106	oa

Pterostichus (Poecilus) sp.	1	0	106	oa
Calathus fuscipes (Goeze)	1	0	106	oa
?Agonum sp.	1	0	106	oa
Amara sp.	1	0	106	oa
Harpalus rufipes (Degeer)	1	0	106	oa
Bradycellus sp. B	1	0	106	oa
Badister sp.	1	0	106	oa
Carabidae sp. A	1	0	106	ob
Carabidae sp. B	1	0	106	ob
Haliplidae sp.	1	0	106	u
Hydroporinae sp. A	1	0	106	oa w
Hydroporinae sp. B	1	0	106	oa w
Sphaeridium ?hipustulatum Fabricius	1	0	106	rf
Cercyon atricapillus (Marsham)	1	0	106	rf
Cercyon haemorrhoidalis (Fabricius)	1	0	106	rf
Cercyon lateralis (Marsham)	1	0	106	rf
Cercyon melanocephalus (Linnaeus)	1	0	106	rt
Cercyon sp.	1	0	106	u
Cryptopleurum minutum (Fabricius)	1	0	106	rf
Anacaena sp.	1	0	106	oa w
Hydrophilinae sp. B	1	0	106	oa w
?Gnathoncus sp.	1	0	106	rt
Hydraena sp.	1	0	106	oa w
Catops sp.	1	0	106	u
Silpha atrata Linnaeus	1	0	106	u
Scydmaenidae sp.	1	0	106	u
Micropeplus sp.	1	0	106	rt
Anthobium sp.	1	0	106	oa
Phyllodrepa ?floralis (Paykull)	1	0	106	rt
Omalium sp.	1	0	106	rt
Omalium sp. B	1	0	106	rt
Omaliinae sp.	1	0	106	u
Aploderus caelatus (Gravenhorst)	1	0	106	rt
Anotylus tetracarinatus (Block)	1	0	106	rt
Stenus (Stenus) sp.	1	0	106	u
Stenus sp. A	1	0	106	u
Stenus sp. B	1	0	106	u
Stenus sp. D	1	0	106	u
Lathrobium sp. B	1	0	106	u
Rugilus orbiculatus (Paykull)	1	0	106	rt
Rugilus sp.	1	0	106	rt
Paederinae sp.	1	0	106	u
Gyrophynus ?angustatus Stephens	1	0	106	rt
Philonthus sp. A	1	0	106	u
Philonthus sp. B	1	0	106	u
Philonthus sp. D	1	0	106	u
Staphylinus sp.	1	0	106	u
Quedius sp.	1	0	106	u
Sepedophilus sp.	1	0	106	u
Tachyporus sp.	1	0	106	u
Tachinus sp.	1	0	106	u
Drusilla canaliculata (Fabricius)	1	0	106	u
Aleocharinae sp. H	1	0	106	u
Aleocharinae sp. I	1	0	106	u
Aleocharinae sp. K	1	0	106	u
Pselaphidae sp.	1	0	106	u
Aphodius luridus (Fabricius)	1	0	106	oa rf
Phyllopertha horticola (Linnaeus)	1	0	106	oa p
Dascillus cervinus (Linnaeus)	1	0	106	oa p
Athous ?haemorrhoidalis (Fabricius)	1	0	106	oa p
Athous sp.	1	0	106	oa p
Agriotes ?obscurus (Linnaeus)	1	0	106	oa p
Malachius sp.	1	0	106	u
Brachypterus sp.	1	0	106	oa p
Monotoma picipes Herbst	1	0	106	rt
Atomaria sp. A	1	0	106	rd
Stilbus sp.	1	0	106	oa p
Orthoperus sp. B	1	0	106	rt
Coccinellidae sp.	1	0	106	oa p

Corticaria sp. A	1	0	106	rt
Corticaria sp. B	1	0	106	rt
Anthicus sp.	1	0	106	rt
Plateumaris sp.	1	0	106	oa w p
Donaciinae sp.	1	0	106	oa w p
Phyllotreta sp. A	1	0	106	oa p
Psylliodes sp.	1	0	106	oa p
Apion (Aspidapion) aeneum (Fabricius)	1	0	106	oa p
Apion (Taenapion) urticarium (Herbst)	1	0	106	oa p
Apion (Oxystoma) cracca (Linnaeus)	1	0	106	oa p
Apion (Oxystoma) pomonae (Fabricius)	1	0	106	oa p
Apion (Protapion) sp. A	1	0	106	oa p
Apion sp. A	1	0	106	oa p
Apion sp. B	1	0	106	oa p
Apion sp. C	1	0	106	oa p
Apion sp. D	1	0	106	oa p
Apion sp. E	1	0	106	oa p
Apion sp. F	1	0	106	oa p
Barypeithes sp.	1	0	106	oa p
Dorytomus sp.	1	0	106	oa p
Ceutorhynchus ?contractus (Marsham)	1	0	106	oa p
Ceutorhynchus sp. A	1	0	106	oa p
Ceutorhynchus sp. B	1	0	106	oa p
Rhinoncus sp.	1	0	106	oa p
Mecinus pyraister (Herbst)	1	0	106	oa p
Gymnetron labile (Herbst)	1	0	106	oa p
Curculionidae sp. A	1	0	106	oa
Curculionidae sp. B	1	0	106	oa
Leperisinus varius (Fabricius)	1	0	106	l
?Hylurgops palliatus (Gyllenhal)	1	0	106	l
Coleoptera sp. A	1	0	106	u
Coleoptera sp. B	1	0	106	u

Table 6. 'Main statistics' for the assemblage of adult beetles and bugs from sample 376+377 from Glebe Farm, Barton-upon-Humber (GFA92)

Erosion = 3 Fragmentation = 3; Weight = 45.000kg

Number of individuals estimated as	N =	796
Number of taxa	S =	233
Index of diversity (alpha)	alpha =	111
Standard error of alpha	SE alpha =	6
Number of 'certain' outdoor taxa	SOA =	119
Percentage of 'certain' outdoor taxa	%SOA =	51
Number of 'certain' outdoor individuals	NOA =	406
Percentage of 'certain' outdoor individuals	%NOA =	51
Number of 'certain' and probable outdoor taxa	SOB =	126
Percentage of 'certain' and probable outdoor taxa	%SOB =	54
Number of 'certain' and probable outdoor individuals	NOB =	428
Percentage of 'certain' and probable outdoor individuals	%NOB =	54
Index of diversity of outdoor component	alpha OB =	60
Standard error	SE alpha OB =	5
Number of aquatic taxa	SW =	28
Percentage of aquatic taxa	%SW =	12
Number of aquatic individuals	NW =	208
Percentage of aquatic individuals	%NW =	26
Number of damp ground/waterside taxa	SD =	10
Percentage of damp ground/waterside taxa	%SD =	4
Number of damp ground/waterside individuals	ND =	82
Percentage of damp ground/waterside individuals	%ND =	10
Number of strongly plant-associated taxa	SP =	61
Percentage of strongly plant-associated taxa	%SP =	26
Number of strongly plant-associated individuals	NP =	136
Percentage of strongly plant-associated individuals	%NP =	17
Number of heathland/moorland taxa	SM =	0
Number of heathland/moorland individuals	NM =	0
Percentage of heathland/moorland individuals	%NM =	0
Number of wood-associated taxa	SL =	4
Number of wood-associated individuals	NL =	9
Percentage of wood-associated individuals	%NL =	1
Number of decomposer taxa	SRT =	62
Percentage of decomposer taxa	%SRT =	27
Number of decomposer individuals	NRT =	266
Percentage of decomposer individuals	%NRT =	33
Number of 'dry' decomposer taxa	SRD =	10
Percentage of 'dry' decomposer taxa	%SRD =	4
Number of 'dry' decomposer individuals	NRD =	53
Percentage of 'dry' decomposer individuals	%NRD =	7
Number of 'foul' decomposer taxa	SRF =	12
Percentage of 'foul' decomposer taxa	%SRF =	5
Number of 'foul' decomposer individuals	NRF =	32
Percentage of 'foul' decomposer individuals	%NRF =	4
Index of diversity of decomposer component	alpha RT =	26
Standard error	SE alpha RT =	3
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 =	46
Percentage of uncoded individuals	PNU =	14