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Biological remains from two medieval ditches at 17-19 St Augustine's Gate, Hedon, N. Humberside (site code HAG93)

by

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Summary

Two samples of sediment representing primary fills of two large, parallel, adjacent ditches dated to the fifteenth century were examined for their content of biological remains. There was good preservation of plant and invertebrate remains in both of the subsamples examined. It appeared that whilst one had formed essentially by natural deposition, though clearly within the sphere of human occupation, the other had more of the character of dumped material, with one component, at least, probably stable manure and another probably human faeces. The insect assemblages are of considerable value in that they represent a period for which there are few well-dated assemblages available.

In addition, a small amount of hand-collected bone was reviewed. It proved to be of limited zooarchaeological potential.

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Introduction

This report deals with plant and invertebrate macrofossils from two samples from deposits interpreted as the primary fills of two large, parallel, adjacent fifteenth century boundary ditches (cuts 8 and 15) on land to the rear of 17-19 St Augustine's Gate, Hedon, and with hand-collected bone from the site in general.

I. Sediment samples

Methods

Both samples were examined in the laboratory and a description of the sediment recorded using a standard *pro forma*. A 1 kg subsample of each was taken for processing for plant and insect remains, broadly following methods described by Kenward *et al.* (1980). Both flots and residues from the samples were quickly scanned for identifiable plant and invertebrate fossils. The insect assemblages were recorded in the flots, apart from difficult identifications, which were made with the material on damp filter paper. Data for the insect assemblages was processed using the methods generally applied in the EAU, producing species lists and main statistics. In addition, 'squashes' were taken from both samples to check for the presence of intestinal parasite eggs (following the methods of Dainton 1992). Plants, parasites and insects were thus treated at different levels, as considered appropriate to the potential value of the material.

Results

Lists of plant remains and other components of the subsamples, and lists of insect remains and main statistics appear in an appendix.

Sample 24, context 20 (ditch 8): Moist, mid-dark grey to mid grey-brown, plastic and sticky to slightly crumbly, slightly sandy silty clay with traces of stones 2-6 mm and of mammal bone.

The modest flot contained a fairly large assemblage of well preserved plant macrofossils and invertebrate remains and the residue was also quite rich in plant macrofossils, in a matrix consisting of about equal proportions of three components: sand; decayed wood and

herbaceous detritus; and cinder and charcoal.

The greatest number of the 'seeds' were of weeds of waste places and cultivated soils, the most abundant being annual nettle (*Urtica urens*), weld or dyer's rocket (*Reseda luteola*) and buttercup (*Ranunculus* Section *Ranunculus*), with a few indicators of wetland, including a few leaves of the raised-bog peat forming moss *Sphagnum imbricatum* (perhaps from imported peat used for fuel, for example). There was also a single fragmentary sea arrow-grass (*Triglochin maritima*) fruit. This species is typical of the upper parts of salt marshes and may have grown quite near the site; however, it has been found in York in Roman and medieval deposits where one possible explanation for its presence has been that it arrived in the dung of herbivores grazed on salt-marsh. Evidence for plants used by man was sparse: a single charred grape (*Vitis vinifera*) pip and one or a few carrot (*Daucus carota*) fruits, the latter quite possibly part of a grassland community.

No parasite eggs were recorded from the 'squash' examined.

There were 75 individuals (MNI) of adult beetles and bugs of the groups used to generate statistics, representing 57 taxa. The assemblage was of high diversity (alpha = 108, SE = 28), and the outdoor component was very large (% N OB = 43). Aquatics were important (% N W = 20). Decomposers were somewhat rare (% N RT = 43), and included a significant proportion of species typically associated with relatively dry plant debris (% N RD = 15, over one third of the RT component).The decomposer component was of somewhat high diversity (alpha RT = 37, SE = 14). These main statistics indicate an assemblage which formed in a fairly random way under wet conditions. This is supported by the species list: the most abundant taxon was *Ochthebius ?minimus* (4 individuals), with *Helophorus* sp. (3) and various other aquatics in smaller numbers. This component indicates static water, and all the species would tolerate some pollution. The abundant *Daphnia* ephippia support this interpretation, and perhaps hint that the ditch dried out intermittently.

This assemblage gave only limited information about the surroundings. A human influence was clearly at work, for there were characteristic synanthropes such as *Tipnus unicolor*, *Mycetaea hirta* and *Sitophilus granarius*, the last being the grain weevil. An additional species likely to have originated through human activity is the sheep ked *Melophagus ovinus*, represented by fragments of an adult and a puparium. An obligate parasite of sheep, *M. ovinus* is more likely to represent evidence of wool or fleece cleaning than of the presence of live animals.

The plant feeders give little evidence, although the weevil *Cidnorhinus quadrimaculatus* feeds on nettles. A larva of the click beetle *Athous haemorrhoidalis* may have been imported with, or washed in from, soil.

A notable record is the weevil *Caulotrupoides aeneopiceus*, a wood-borer which is rather rare at the present.

Sample 23, context 21 (ditch 15), dark grey-brown, crumbly and soft, working sticky (rubbing brown), moderately humic sandy clay silt, with thin grey clay lenses, a few stones 2-20 mm, and traces of brick/tile and wood.

Preservation of 'seeds' in the small flot from this subsample was moderately good. The residue contained abundant small stones of a variety of lithologies, including one mica-rich clast from a metamorphic rock (?from local drift or from ballast). Cinder and charcoal were quite common and there were a few small fragments of leather and traces of marine mollusc shell, fish bone and wood, as well one sheep second phalange. The bulk of the identifiable plant macrofossils were of weeds of waste places and cultivated land, especially stinging and annual nettles (*Urtica dioica*; *U. urens*), and dyer's rocket. There were, in addition to several charred wheat grains, some hazel (*Corylus avellana*) nutshell and a single fragment of a 'plum' (*Prunus domestica* ssp. *insititia*), three taxa which might have been cultivated (though all are native species that could have grown in the vicinity): carrot (*Daucus carota*), celery (*Apium graveolens*) and fennel (*Foeniculum vulgare*). The last two of these are often recorded in deposits clearly consisting of or including human faeces, and in this regard it is interesting that the small subsample checked for parasite eggs produced trace amounts of *Trichuris*, the whipworm.

The abundant insect remains were chemically somewhat better preserved than normal in waterlogged archaeological deposits. There were several beetle larvae and fly puparia, an adult and putative puparium of the sheep ked, *Melophagus ovinus*, and a variety of other remains, in addition to 171 individuals of 92 adult beetle and bug taxa. Large numbers of mites and moderate numbers of *Daphnia* ephippia were also recorded.

The beetle and bug assemblage was of high diversity (alpha = 81, SE = 11), and also appeared (subjectively) somewhat mixed in terms of the ecological groups represented. 'Outdoor' forms made up a substantial proportion of the assemblage, but by no means predominated (% N OB = 19). Only one 'outdoor' taxon (*Platystethus nitens*, a mud-dweller, of which there were five) was represented by more than two individuals; there were few aquatics. There is thus little reason to believe that this deposit formed slowly under natural conditions (in apparent contrast to context 20).

Decomposer insects were strongly represented (% N RT = 68), although even this component was of relatively high diversity (alpha RT = 35, SE = 5; a value of 20 for alpha RT would be typical of richly organic urban occupation deposits). Both 'foul' and 'dry' decomposers were moderately numerous (% N RD = 14; % N RF = 8), again emphasising the likely mixed origins of the assemblage. One community which could be discerned amongst the decomposers was of somewhat foul, probably open-textured, organic matter. Species likely to have lived together in such a habitat included *Acritus nigricornis* (with 13 individuals, the most abundant species by far), *Lathridius minutus* group and a *Corticaria* species (both 7), *Platystethus arenarius*, *Leptacinus pusillus*, *Monotoma picipes*, and *Enicmus* sp. (all 5) and a variety of the rarer taxa. Amongst the last, *Cryptophagus acutangulus* (2 individuals), *Cercyon quisquilius*, *Cryptophagus scutellatus*, *Mycetaea hirta* and *Typhaea stercorea* (all single individuals) are of

note; the last three perhaps, like *Tipnus unicolor*, suggesting an origin within a building.

There were two clues suggesting that this material may have been stable manure. Firstly, small numbers of the grain beetles *Oryzaephilus surinamensis* (4) and *Sitophilus granarius* (1) were present. Observations on large numbers of Roman assemblages including decomposers such as those found in the present sample together with grain beetles suggest that the latter may have typically originated in poor quality grain used for horse feed. Secondly, there were single individuals of several species, including two *Apion* spp. and two *Sitona* spp. and *Mecinus pyraster*, which may well have originated in hay.

II. Animal bone

The excavations produced a single standard-sized box of animal bones from deposits of three main phases: Phase 1 (15th century), Phase 2 (late 15th-early 16th centuries) and Phase 3 (17th century). In all, bone was recovered from six contexts and it amounted to a total of only 59 fragments (2408.5 g), of which 31 (1688 g) could be identified to species.

Since all material was hand-collected, the assemblage will be biased towards the larger and more visible species and elements.

Preservation overall ranged from good to fair, with most of the fragments being brown in colour. No visible fresh breaks were recorded and only one fragment showed characteristic signs of dog gnawing. Evidence of butchery was noted in each context and, with the exception of two caprovid elements which showed chop marks, were restricted to cow-sized fragments only.

The range of species present included cow (10 fragments), caprovid (16 fragments), pig (3 fragments) and bird (2 fragments, goose and domestic fowl). The lack of quantitative recovery and the small size of the assemblage means that any assessment of importance of each taxon is meaningless. A total of 14 measurable fragments were recorded from the entire assemblage (almost all caprovid elements) but almost no mandible fragments or loose teeth were recovered (exceptions being a pig mandible and caprovid third molar from context 12).

A caprovid metacarpal from context 9 showed evidence of severe and chronic osteomyelitis affecting the whole bone. On the anterior aspect there were four well-formed cloacas, whilst on the posterior surface a good deal of remodelling and deposition of new bone had occurred. around the original muscle and other soft tissue. Although the proximal articular surface remained unaffected, the distal condyles exhibited degeneration of their surfaces. The obviously chronic nature of the infection indicates that this animal was affected for some time prior to death.

III. Implications

In summary, the sediment samples have provided useful assemblages of macrofossil remains, particularly those of insects. The two ditch fills appeared to have formed in rather different ways, context 20 having built up essentially naturally (though there was certainly evidence of human presence), whilst context 21 incorporated foul waste, probably stable manure with some human faeces. Apart from evidence for weed communities, there was little information concerning the surroundings of the ditches. Hints that wool or fleece cleaning may have been practised in the vicinity came from small numbers of sheep keds, although these may conceivably have come from live animals if the ditches represented field boundaries at some stage in the formation of these deposits. The samples are worthy of long-term retention under appropriately cool, dark conditions.

The very small size of the total bone assemblage and the limited numbers of fragments providing biometrical and age at death information mean that little zooarchaeological information can be gleaned from the study of this assemblage. It is recommended that no further work be undertaken on the bone material and it need not be retained.

IV. Archive

The extracted biological remains are stored at the Environmental Archaeology Unit, University of York, where the manuscript listing sheets, working notes and electronic and paper copies of this report and the processed data for the insect assemblages are deposited.

V. References

Dainton, M. (1992). A quick, semi-quantitative method for recording nematode gut parasite eggs from archaeological deposits. *Circaea* **9**, 58-63

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

Appendix

List of plant taxa and other components of samples from St Augustine's Gate, Hedon. Abundance is scored on a four-point scale from + (rare, trace) to ++++ (abundant). All remains were preserved by waterlogging unless otherwise noted.

Sample	parts recorded	23	24
Taxon/material			
Agrostemma githago	seed fragments	+	-
Anagallis arvensis	seeds	+	-
Apium graveolens	fruits	-	+
Atriplex sp(p).	seeds	+	+
Brassica sp(p).	seeds	+	+
Carduus/Cirsium sp(p).	achenes	+	-
Carex sp(p).	nutlets	+	+
Chenopodium Section *Pseudoblitum*	seeds	+	-
Conium maculatum	fruits	+	-
Corylus avellana	nutshell fragments	+	-
Daucus carota	fruits	+	+
Foeniculum vulgare	fruit	-	+
Gramineae	caryopses	-	+
Juncus bufonius	seeds	+	-
J. compressus/gerardi	seeds	+	-
Lamium Section *Lamiopsis*	nutlets	+	+
Malva sp.	mineralised seed	-	+
M. sylvestris	nutlets	-	+
Plantago major	seeds	-	+
Polygonum aviculare agg.	nutlets	+	+
Prunella vulgaris	nutlets	+	-
Prunus domestica ssp. *insititia*	fruitstone fragment	+	-
Quercus sp(p).	bud-scales)	+	-
Ranunculus flammula	achenes	+	-
R. Section *Ranunculus*	achenes	++	-
Raphanus raphanistrum	pod fragments	+	-
Reseda luteola	seeds	++	++
Rumex sp(p).	nutlets	+	+
Sambucus nigra	seeds	+	+
Scirpus lacustris	nutlets	+	-
Sonchus asper	achenes	+	-
Sphagnum imbricatum	leaves	+	+
Stellaria media	seeds	+	+
Torilis japonica	fruits	-	+
Triglochin maritima	fruits	+	-

Triticum sp(p).	charred caryopses	++	-
Urtica dioica	achenes	+	++
U. urens	achenes	++	++
Vitis vinifera	charred seed	-	+
Bryum sp.	shoots	-	+
charcoal		++	++
twig fragments		-	+
wood fragments		+	+
beetles		++	++
Cerastoderma edule (cockle)	shell	+	-
Daphnia	ephippia	+	++
fly puparia		+	-
marine mollusc shell		-	+
mites		+	-
burnt bone		+	-
fish bone		+	+
leather		+	+
brick/tile		+	+
burnt shale (?from coal)		+	-
cinder		++	++
coal		-	+
stone		+	+

Main statistics and full species lists in rank order for the assemblages of adult beetles and bugs from St Augustine's Gate, Hedon

Site: HAG93 Context: 21 Sample: 23 - beetle/bug main statistics

Erosion = 2 Fragmentation = 3; Weight = 1.000kg

Number of individuals estimated as	N =	171
Number of taxa	S =	92
Index of diversity (alpha)	alpha =	81
Standard error of alpha	SE alpha =	11
Number of 'certain' outdoor taxa	SOA =	20
Percentage of 'certain' outdoor taxa	%SOA =	22
Number of 'certain' outdoor individuals	NOA =	25
Percentage of 'certain' outdoor individuals	%NOA =	15
Number of 'certain' and probable outdoor taxa	SOB =	27
Percentage of 'certain' and probable outdoor taxa	%SOB =	29
Number of 'certain' and probable outdoor individuals	NOB =	33
Percentage 'certain' and probable outdoor individuals	%NOB =	19
Index of diversity of outdoor component	alpha OB =	68
Standard error	SE alpha OB =	29
Number of aquatic taxa	SW =	3
Percentage of aquatic taxa	%SW =	3
Number of aquatic individuals	NW =	3
Percentage of aquatic individuals	%NW =	2
Number of damp ground/waterside taxa	SD =	5
Percentage of damp ground/waterside taxa	%SD =	5
Number of damp ground/waterside individuals	ND =	9
Percentage of damp ground/waterside individuals	%ND =	5
Number of strongly plant-associated taxa	SP =	10
Percentage of strongly plant-associated taxa	%SP =	11
Number of strongly plant-associated individuals	NP =	10
Percentage of strongly plant-associated individuals	%NP =	6
Number of heathland/moorland taxa	SM =	0
Number of heathland/moorland individuals	NM =	0
Percentage of heathland/moorland individuals	%NM =	0
Number of wood-associated taxa	SL =	2
Number of wood-associated individuals	NL =	5
Percentage of wood-associated individuals	%NL =	3
Number of decomposer taxa	SRT =	51
Percentage of decomposer taxa	%SRT =	55
Number of decomposer individuals	NRT =	116
Percentage of decomposer individuals	%NRT =	68
Number of 'dry' decomposer taxa	SRD =	11
Percentage of 'dry' decomposer taxa	%SRD =	12
Number of 'dry' decomposer individuals	NRD =	24
Percentage of 'dry' decomposer individuals	%NRD =	14
Number of 'foul' decomposer taxa	SRF =	8
Percentage of 'foul' decomposer taxa	%SRF =	9
Number of 'foul' decomposer individuals	NRF =	13
Percentage of 'foul' decomposer individuals	%NRF =	8
Index of diversity of decomposer component	alpha RT =	35
Standard error	SE alpha RT =	5
Number of individuals of grain pests	NG =	5
Percentage of individuals of grain pests	%NG =	3
Number of individuals of grain pests	NG =	5
Number of uncoded taxa	SU =	13
Percentage of uncoded individuals	PNU =	9

Site: HAG93 Context: 21 Sample: 23 - species list in rank order

Taxon	Number	%	Rank	Ecodes
Acritus nigricornis (Hoffmann)	13	8	1	rt
Lathridius minutus group	7	4	2	rd
Corticaria sp. A	7	4	2	rt
Platystethus arenarius (Fourcroy)	5	3	4	rf
Platystethus nitens (Sahlberg)	5	3	4	oa d
Leptacinus ?pusillus (Stephens)	5	3	4	rt
Monotoma picipes Herbst	5	3	4	rt
Enicmus sp.	5	3	4	rt
Carpelimus ?bilineatus Stephens	4	2	9	rt
Anobium punctatum (Degeer)	4	2	9	l
Ptinus sp.	4	2	9	rd
Oryzaephilus surinamensis (Linnaeus)	4	2	9	g
Corticaria sp. B	4	2	9	rt
Oxytelus sculptus Gravenhorst	3	2	14	rt
Falagria caesa or sulcatula	3	2	14	rt
Cryptophagus sp.	3	2	14	rd
Corticarina or Cortinicara sp.	3	2	14	rt
Helophorus nubilus Fabricius	2	1	18	oa
Cercyon analis (Paykull)	2	1	18	rt
Xylodromus concinnus (Marsham)	2	1	18	rt
Stenus sp.	2	1	18	u
Gyrohypnus fracticornis (Muller)	2	1	18	rt
Philonthus sp. A	2	1	18	u
Cordalia obscura (Gravenhorst)	2	1	18	rt
Aleocharinae sp. B	2	1	18	u
Aphodius granarius (Linnaeus)	2	1	18	ob rf
Cryptophagus acutangulus (Gyllenhal)	2	1	18	rd
Atomaria sp.	2	1	18	rd
Aglenus brunneus (Gyllenhal)	2	1	18	rt
Pentatomidae sp.	1	1	30	oa p
Aphrodes flavostriatus (Donovan)	1	1	30	oa p d
Clivina fossor (Linnaeus)	1	1	30	oa
Trechus obtusus or quadristriatus	1	1	30	oa
Pterostichus (Poecilus) sp.	1	1	30	oa
Carabidae sp. A	1	1	30	ob
Carabidae sp. B	1	1	30	ob
Helophorus sp. A	1	1	30	oa w
Helophorus sp. B	1	1	30	oa w
Cercyon atricapillus (Marsham)	1	1	30	rf
Cercyon quisquilius (Linnaeus)	1	1	30	rf
Cercyon ?terminatus (Marsham)	1	1	30	rf
Megasternum obscurum (Marsham)	1	1	30	rt
Cryptopleurum minutum (Fabricius)	1	1	30	rf
Ochthebius sp.	1	1	30	oa w
Ptenidium sp.	1	1	30	rt
Acrotrichis sp.	1	1	30	rt
Micropeplus fulvus Erichson	1	1	30	rt
Dropephylla sp.	1	1	30	u
Omalium excavatum Stephens	1	1	30	rt
Omalium ?rivulare (Paykull)	1	1	30	rt
Omalium sp.	1	1	30	rt
Xylodromus ?depressus (Gravenhorst)	1	1	30	rt
Omaliinae sp.	1	1	30	u
Carpelimus sp.	1	1	30	u
Anotylus complanatus (Erichson)	1	1	30	rt
Anotylus nitidulus (Gravenhorst)	1	1	30	rt d
Anotylus rugosus (Fabricius)	1	1	30	rt
Anotylus tetracarinatus (Block)	1	1	30	rt
Xantholinus linearis group	1	1	30	rt
Neobisnius sp.	1	1	30	u

Philonthus sp. B	1	1	30	u
Tachyporus sp.	1	1	30	u
Aleocharinae sp. A	1	1	30	u
Aleocharinae sp. C	1	1	30	u
Aleocharinae sp. D	1	1	30	u
Trox scaber (Linnaeus)	1	1	30	rt
Aphodius sp. A	1	1	30	ob rf
Aphodius sp. B	1	1	30	ob rf
Clambus ?pubescens Redtenbacher	1	1	30	rt
Cyphon sp.	1	1	30	oa d
Dryops sp.	1	1	30	oa d
Elateridae sp.	1	1	30	ob
Cantharidae sp.	1	1	30	ob
Tipnus unicolor (Piller & Mitterpacher)	1	1	30	rd
Omosita sp.	1	1	30	rt
Cryptophagus scutellatus Newman	1	1	30	rd
Ephistemus globulus (Paykull)	1	1	30	rd
Orthoperus sp.	1	1	30	rt
Mycetaea hirta (Marsham)	1	1	30	rd
Dienerella sp.	1	1	30	rd
Typhaea stercorea (Linnaeus)	1	1	30	rd
Bruchidae sp.	1	1	30	u
Halticinae sp. A	1	1	30	oa p
Halticinae sp. B	1	1	30	oa p
Apion sp. A	1	1	30	oa p
Apion sp. B	1	1	30	oa p
Sitona sp. A	1	1	30	oa p
Sitona sp. B	1	1	30	oa p
Sitophilus granarius (Linnaeus)	1	1	30	g
Ceutorhynchus sp.	1	1	30	oa p
Mecinus pyraster (Herbst)	1	1	30	oa p
Leperisinus varius (Fabricius)	1	1	30	l

Site: HAG93 Context: 20 Sample: 24 - beetle/bug main statistics

Erosion = 3 Fragmentation = 3; Weight = 1.000kg

Number of individuals estimated as	N =	75
Number of taxa	S =	57
Index of diversity (alpha)	alpha =	108
Standard error of alpha	SE alpha =	28
Number of 'certain' outdoor taxa	SOA =	21
Percentage of 'certain' outdoor taxa	%SOA =	37
Number of 'certain' outdoor individuals	NOA =	28
Percentage of 'certain' outdoor individuals	%NOA =	37
Number of 'certain' and probable outdoor taxa	SOB =	25
Percentage of 'certain' and probable outdoor taxa	%SOB =	44
Number of 'certain' and probable outdoor individuals	NOB =	32
Percentage 'certain' and probable outdoor individuals	%NOB =	43
Index of diversity of outdoor component	alpha OB =	52
Standard error	SE alpha OB =	21
Number of aquatic taxa	SW =	9
Percentage of aquatic taxa	%SW =	16
Number of aquatic individuals	NW =	15
Percentage of aquatic individuals	%NW =	20
Number of damp ground/waterside taxa	SD =	3
Percentage of damp ground/waterside taxa	%SD =	5
Number of damp ground/waterside individuals	ND =	4
Percentage of damp ground/waterside individuals	%ND =	5
Number of strongly plant-associated taxa	SP =	6
Percentage of strongly plant-associated taxa	%SP =	11
Number of strongly plant-associated individuals	NP =	6
Percentage of strongly plant-associated individuals	%NP =	8

Number of heathland/moorland taxa	SM =	0
Number of heathland/moorland individuals	NM =	0
Percentage of heathland/moorland individuals	%NM =	0
Number of wood-associated taxa	SL =	2
Number of wood-associated individuals	NL =	4
Percentage of wood-associated individuals	%NL =	5
Number of decomposer taxa	SRT =	23
Percentage of decomposer taxa	%SRT =	40
Number of decomposer individuals	NRT =	32
Percentage of decomposer individuals	%NRT =	43
Number of 'dry' decomposer taxa	SRD =	7
Percentage of 'dry'decomposer taxa	%SRD =	12
Number of 'dry' decomposer individuals	NRD =	11
Percentage of 'dry'decomposer individuals	%NRD =	15
Number of 'foul' decomposer taxa	SRF =	1
Percentage of 'foul' decomposer taxa	%SRF =	2
Number of 'foul' decomposer individuals	NRF =	1
Percentage of 'foul' decomposer individuals	%NRF =	1
Index of diversity of decomposer component	alpha RT =	37
Standard error	SE alpha RT =	14
Number of individuals of grain pests	NG =	1
Percentage of individuals of grain pests	%NG =	1
Number of individuals of grain pests	NG =	1
Number of uncoded taxa	SU =	7
Percentage of uncoded individuals	PNU =	9

Site: HAG93 Context: 20 Sample: 24 - species list in rank order

Taxon	Number	%	Rank	Ecodes
Ochthebius ?minimus (Fabricius)	4	5	1	oa w
Helophorus sp.	3	4	2	oa w
Omalium ?rivulare (Paykull)	3	4	2	rt
Anobiidae sp.	3	4	2	l
Lathridius minutus group	3	4	2	rd
Hydroporinae sp.	2	3	6	oa w
Ptenidium sp.	2	3	6	rt
Carpelimus ?bilineatus Stephens	2	3	6	rt
Platystethus nitens (Sahlberg)	2	3	6	oa d
Falagria caesa or sulcatula	2	3	6	rt
Cryptophagus sp. A	2	3	6	rd
Atomaria sp.	2	3	6	rd
Lygaeidae sp.	1	1	13	oa p
Bembidion sp.	1	1	13	oa
Pterostichus sp.	1	1	13	ob
Amara sp.	1	1	13	oa
Carabidae sp.	1	1	13	ob
Agabus bipustulatus (Linnaeus)	1	1	13	oa w
Colymbetes fuscus (Linnaeus)	1	1	13	oa w
Helophorus grandis Illiger	1	1	13	oa w
Cercyon analis (Paykull)	1	1	13	rt
Cercyon sp.	1	1	13	u
Hydrobius fuscipes (Linnaeus)	1	1	13	oa w
Ochthebius ?pusillus Stephens	1	1	13	oa w
Ochthebius sp. B	1	1	13	oa w
Micropeplus sp.	1	1	13	rt
Olophrum sp.	1	1	13	oa
Omalium excavatum Stephens	1	1	13	rt
Carpelimus elongatulus (Erichson)	1	1	13	oa d
Carpelimus sp.	1	1	13	u
Platystethus degener Mulsant & Rey	1	1	13	oa d
Anotylus complanatus (Erichson)	1	1	13	rt
Neobisnius sp.	1	1	13	u

Staphylinus sp.	1	1	13	u
Staphylininae sp.	1	1	13	u
Cordalia obscura (Gravenhorst)	1	1	13	rt
Aleocharinae sp. A	1	1	13	u
Staphylinidae sp.	1	1	13	u
Trox scaber (Linnaeus)	1	1	13	rt
Aphodius sp.	1	1	13	ob rf
Clambus sp.	1	1	13	rt
Elateridae sp.	1	1	13	ob
Tipnus unicolor (Piller & Mitterpacher)	1	1	13	rd
Ptinus sp.	1	1	13	rd
Brachypterus sp.	1	1	13	oa p
Monotoma sp.	1	1	13	rt
Cryptophagus sp. B	1	1	13	rd
Mycetaea hirta (Marsham)	1	1	13	rd
Enicmus sp.	1	1	13	rt
Corticaria sp. A	1	1	13	rt
Corticaria sp. B	1	1	13	rt
Apion sp.	1	1	13	oa p
Strophosomus sp.	1	1	13	oa p
Caulotrupoides aeneopiceus (Boheman)	1	1	13	l
Sitophilus granarius (Linnaeus)	1	1	13	g
Cidnorhinus quadrimaculatus (Linnaeus)	1	1	13	oa p
Ceutorhynchus sp.	1	1	13	oa p