Ancient Monuments Laboratory
Report 194/87

INSECT REMAINS FROM COPTHALL AVENUE LONDON.

Enid Allison & Harry Kenward

Ancient Monuments Laboratory Report 194/87

INSECT REMAINS FROM COPTHALL AVENUE, LONDON.

Enid Allison & Harry Kenward

Summary

The insect remains from 32 samples were examined in detail. The majority were of Roman date, but some were from natural valley deposits and others of medieval date Preservation had been by 'waterlogging'. The remains had been extracted by non-standard techniques, and the majority of the assemblages were small, but many had such a strong character that their implications were clear.

The fauna from the natural valley fills indicated that the deposits had formed during a period when the influence of man in the area was weak. By the late 1st-early 2nd century human settlement had reached urban density in the vicinity of the site, and trade had resulted in the importation of alien grain pests. Insect faunas of predominantly urban character were obtained throughout the Roman phases; aquatic and water-side species were also well-represented. Samples dated to the late 11th- early 12th century were from peat, with a fauna associated with sluggish or still water with abundant vegetation, and with water margins. There was no evidence for human occupation at or near the site of deposition from three of the four samples dated to this stage.

Authors' address :-

Environmental Archaeology Unit
University of York
Heslington
YORK
YO1 5DD

0904 430000 x5531/ 5849

Introduction

A total of 65 samples of insect remains were examined, and 32 of these were fully identified. The remaining groups were all very small. Preservation had been by waterlogging and was generally good. The samples examined were mainly of Roman date, but several were from the natural valley deposits and from medieval layers dated to the late 11th - early 12th century.

Methods

Samples were processed and insect remains extracted by members of the Department of Urban Archaeology. The samples were divided into two groups. The first group was sorted in 1982 from 1kg soil samples. Varying proportions of insect remains were recovered from different sieve mesh fractions. All insect fragments ÷1mm in size were extracted, but lesser proportions (between 5 and 66%, rarely 100%) were usually recovered from 500 and 250 micron mesh fractions. Thus a substantial proportion of smaller insects will have been lost. No paraffin flotation was carried out and raw material was not available for re-processing. For these reasons, and due to shortage of time, these samples were not subjected to detailed examination. The remainder of the insect samples were obtained from 0.25kg soil samples, the whole of each sample being sorted in 1984-5.

Numbers of individuals (N) and numbers of taxa (S) in each sample were recorded. When possible, an index of diversity (alpha) was calculated following Fisher et al., 1943 (see also Kenward, 1978). The assemblages from each sample were also divided into broad ecological groupings: for example, outdoor (OB), aquatic (W), damp ground and waterside (D), and decomposer (RT) taxa. The percentage of the total assemblage formed by each group was then calculated. For present purposes the decomposer group consists only of species associated with accumulations of rotting organic matter (Kenward, 1982). The abundances of two other sub-groups of decomposers, grain pests (G) and wood destroyers (L) were calculated separately.

When the material was being identified it became obvious that there was sometimes a bias towards the more easily seen fossils; in some cases certain parts of particular taxa had probably been overlooked; heads and thoraxes of Bembidion spp. and Ochthebius sp., and thoraxes of Falagria sp., were examples. This made identification impracticable in a good number of cases. Because the assemblages were biassed in this way, and because the project had to be carried out very rapidly, identifications were not taken to specific level in some cases where a disproportionate amount of time would have been spent to obtain little archaeological information, Equally, the statistics obtained from analysis of the assemblages must be treated with caution.

The data archive

The data from the insect samples have been computer-recorded and processed on the University of York VAX-cluster mainframe

computer, using a system (written in PASCAL by HK) which produces ordered lists and statistics of value in interpretation. The same system creates database files for analysis in the DATATRIEVE data interrogation program. These are stored in hard copy in archive at the Environmental Archaeology Unit, University of York, and a copy has been submitted to the Department of Urban Archaeology, Museum of London. Original lists are retained in computer hard disc store and can be reprocessed at any time. Lists and main statistics are also stored in the Environmental Archaeology Unit's database system.

The assemblages

Natural valley fills

709

Only single individuals of nine taxa were recorded. Over half were outdoor forms; they came from a variety of habitats. There were no synanthropes.

712

More than half of the small group of insects (16 individuals) were outdoor forms, and a quarter were aquatics. Otherwise there was little evidence as to ecology and depositional regime. There were no synanthropic taxa.

719

The assemblage of beetles was small: 18 individuals of 17 taxa. Many were outdoor forms (39%) and the assemblage lacks taxa particularly favoured by the presence of man.

723

Only five individuals were represented by the fragments presented. Obviously such a group can give little information, although they are compatible with the fauna of other samples from the 'natural valley fills'.

Summary of natural valley fill group

None of this group of assemblages was at all large. Amalgamated, they presented a picture of an environment in which the influence of man was weak - there were no obligate synanthropes, for example. It appears that these deposits formed before nearby human settlement had reached urban density: had it done so, even at some distance, experience with material from other Roman sites would lead us to expect some urban insects to be present in the 'background fauna', transported from distant habitats.

Phase II : late 1st - early 2nd century

601 (flood deposit : sub-phase 8)

The small assemblage (N = 69) was diverse and a variety of habitats were represented, none of them strongly. No clear conclusions concerning the nature of this layer can be drawn.

604 (ditchfill : sub-phase 9)

A modest assemblage of beetles and a single bug were recorded. There were 68 taxa but only 85 individuals, so diversity was high (estimated as alpha = 157, but with a large error). Outdoor forms made up 32% of taxa and 31% of individuals; they came from a variety of habitats. Aquatics were well represented proportionally, but not outstandingly abundant (%N W = 6); the four aquatic taxa were all common and eurytopic. Decomposers did not make up a particularly large part of the fauna (%N RT = 34). The species list included some strongly synanthropic taxa, such as the grain beetles Oryzaephilus surinamensis, Sitophilus granarius, and Cryptolestes ferrugineus, woodworm Anobium punctatum, Aglenus brunneus and Tenebrio obscurus. There was also a considerable component of other taxa commonly recorded together in urban assemblages. Deposition under semi-natural conditions seems likely, but fauna from human habitation was incorporated, by rubbish dumping, in flowing water, or as background fauna.

562 A (channel fill : sub-phase 10)

A quite small group of insects was recovered - 45 taxa and 68 individuals. This assemblage was essentially like that from sample 604, but with a slightly smaller component from semi-natural habitats. Decomposers were fairly numerous and made up 58% of the fauna, and synanthropes (grain beetles and others) were an important part of the assemblage. The decomposers may have included a breeding group - Cercyon spp., Megasternum obscurum, Oxytelus sculptus etc. - for while the numbers are too small to be certain the diversity of the decomposer component is quite low (alpha RT = 22, SE = 7).

562 B (channel fill : sub-phase 10)

The assemblage from sample 562B added considerably to the evidence from 562A. A total of 81 individuals of Coleoptera were recorded. Grain pests were numerous, and other synanthropes present in small numbers but amounting to a fauna distinctly like those seen in Roman and Anglo-Scandinavian wooden buildings. Outdoor taxa made up almost a quarter of this assemblage, but only one of these species (Platystethus nitens) was represented by more than one individual. Thus the fauna of the two samples 562A and B show clearly that the channel infilled under

conditions which allowed the entry of fauna from human settlement - either in dumped rubbish or in outflow water. The fills may have formed rather rapidly, so that the number of insects living in the channel and its surroundings which became incorporated was restricted.

583 (channel fill : sub-phase 10)

A quite small assemblage of beetles was recorded: 28 individuals from 23 taxa. It was ecologically mixed, with over a third made up by outdoor taxa from aquatic, waterside and terrestrial habits. The decomposer fauna was distinctly synanthropic and there were some grain beetles.

588 (channel fill : sub-phase 10)

The insect assemblage was quite large by the standards of the present site - 104 individuals and 69 taxa - and was mathematically and ecologically very diverse. Taxa typical of urban ecosystems predominated, and damp ground and foul matter species were (relatively) well represented. Over a third of the species were classified as 'outdoor' forms, but no clear picture of the surroundings emerged. This group probably included a small autochthonous fauna of the channel, with the greater part being background fauna or originating in rubbish or outflow from buildings.

591 (channel fill : sub-phase 10)

There were at least 63 individuals in the small assemblage, and 45 taxa were identified. The most abundant species was Carpelimus ?gracilis, which probably lived in mud in the channel. Synanthropic and typical man-associated taxa were well-represented, but no species were more numerous than could be accounted for by an origin as 'background fauna'.

593 (channel fill : sub-phase 10)

A minimum of 39 individuals from 33 taxa were present. Twenty-six percent of the individuals were of outdoor taxa, and a substantial proportion of these were aquatic and waterside forms. The influence of man was clearly present, however, with grain beetles and a group of decomposers typical of occupation sites.

Summary of Phase II

It is clear that by the time these channels were infilling there was human settlement at urban density nearby, with sufficient organisation, and centralisation and trade to import

alien grain pests such as Sitophilus granarius and Oryzaephilus surinamensis. At York, grain imports probably introduced such a fauna at the earliest stages of the establishment of the Roman fortress (Kenward and Williams, 1979) and very probably the same was true in London. Whether this fauna entered the channel as background fauna, in outflow water, or dumped waste, is not certain, but the last two mechanisms seem most likely.

Phase III : late 2nd and 3rd century

306 (turf foundation of road : sub-phase 11)

Only single individuals of 14 taxa were present; the group was dominated by outdoor forms and could have been a random sub-sample from the Phase II assemblages.

350 (turf foundation of road : sub-phase 11)

The recovered assemblage was small and only Cercyon analis was represented by more than one individual. The fauna was not very informative, and there was no clear component from 'turf' of any kind (the three Aphodius spp. could, conceivably, have originated in grazing land soil, but to assert this would be to vastly exceed the evidence).

523 (organic dump : sub-phase 12)

At least 29 individuals of 18 taxa were present. Only Carpelimus pusillus was numerous, with 10 individuals. Most of the assemblage was of taxa frequently recorded from urban sites, although there were no obligate synanthropes.

382 (pitfill : sub-phase 16)

Only single individuals of 16 taxa were present. The outdoor group was important, but little can be said of this assemblage other than that it fits into the pattern for this phase of the site.

214 (floor surface : sub-phase 17)

The number of insects recovered was small, 22 individuals from 25 taxa. They appeared to be urban fauna with a few outdoor forms. The more abundant taxa, with the exception of Aphodius sp., were typical of faunas from buildings, but the assemblage is

too small for confident interpretation.

367 (decayed wood or cut peat : sub-phase 18)

Only 10 taxa were recorded, all as single individuals. The assemblage had no special character, but was not unusual for urban material. No taxa suggested peat of any kind.

184 (drain fill : sub-phase 22)

The sample was clearly very rich in insects, since 0.25kg gave 129 individuals of 85 taxa. The assemblage was very diverse: alpha = 108, SE = 19. The outdoor component was correspondingly large, %N OB = 33. Aquatic and waterside forms were quite well represented, together making 34% of the outdoor component. Only 39% of the individuals were of decomposer taxa, although since the decomposers include many small species it is possible that they were under-represented through bias in extraction. Within this component, taxa typically found in relatively dry rotting matter were not especially important, but those exploiting foul matter were quite numerous. The only abundant species was Anobium punctatum, the woodworm beetle. This probably originated in structural timber, although this may only have been fencing or dumped building material nearby. The rest of the fauna probably also came from outside the area of deposition, on the banks and in the surrounding area. There were plenty of species and a modest number of individuals of strongly synanthropic forms, for example grain beetles, the "bread beetle" Stegobium paniceum and spider beetles. These may have been background fauna, but they may also have been carried in outflow from nearby buildings or have come in dumps of rubbish or re-deposited material.

Summary of Phase III

This heterogenous group of deposits gave faunas of predominantly urban character.

Phase IV : mid 3rd - 4th century

119 (peat formation : sub-phase 25)

Although the assemblage submitted was not large (N = 54, S = 36), it was distinctive. Outdoor forms were predominant, making up 69% of the fauna, and this component was of (relatively) low diversity; alpha OB = 39, SE 14. Aquatics made up 30% of the whole assemblage, and damp ground/aquatic marginal taxa a further 28%: these two groups together made up 84% of the outdoor component. This was clearly a wetland deposit, and water with

abundant submerged and emergent vegetation, and swampy margins, was the likely habitat. There were no species particularly associated with human settlement or areas disturbed by man.

133 (ditchfill : sub-phase 27)

This group was small (N = 22, S = 21), and primarily made up of a mixture of aquatics, plant feeders and some synanthropes. The only taxon with more than one individual was Brachypterus sp., found on nettles (Urtica).

134A (ditchfill : sub-phase 27)

There were few insects, 17 individuals of 16 taxa, and these were ecologically mixed. No single habitat was predominant.

144 (ditchfill : sub-phase 27)

There were 30 taxa, only one of which was represented by more than one individual, and this, an unidentified small staphylinine, was represented by only two. Diverse habitats were represented, with abundant outdoor forms (%N OB = 52). The only strong synanthrope was Stegobium paniceum.

146 (ditchfill : sub-phase 27)

This was a small ecologically mixed group (23 taxa, 24 individuals), half of it made up by outdoor taxa. There were some grain beetles, but little can be said of the assemblage - it may have been entirely of 'background' origin.

172 (pitfill : sub-phase 27)

Very few insects were recovered, only 9 individuals from 7 taxa. These resembled a small random subset of an assemblage such as that of samples 144 and 146.

110 (pitfill : sub-phase 30)

This sample produced an assemblage of modest size, 63 taxa being present, and 114 individuals. Outdoor forms were predominant (%N OB = 63, %S OB = 60), and this component was of quite low diversity (alpha OB = 33, SE = 7), which perhaps indicates an origin from nearby living communities. Decomposers were very poorly represented (%N RT = 11), and still relatively rare even if some uncoded taxa probably belonging with this group were included. This is a most unusual assemblage for a pitfill; typically pit deposits are dominated by decomposers. This fill

may have formed gradually, so that a local fauna of semi-natural habitats entered. Alternatively, a deposit containing such a fauna may have been used as a back-fill for the pit.

99 (peat formation : sub-phase 31)

This was presumably a 'spot find'. The tube contained fragments of an individual of Hydrophilus piceus, the "great silver water beetle". This species is not too uncommon on the less disturbed parts of the marshes around the Thames estuary at the present day.

99A (peat formation : sub-phase 31)

Only 10 individuals of 8 taxa were present. The fauna was compatible with that from sample 119, with a strongly outdoor character, but obviously cannot safely be further interpreted.

Summary of Phase IV

Peat formation 119 was clearly a wetland deposit with no evidence of the presence of man. The ditchfills gave small assemblages with some synanthropes. From the pitfills the only large assemblage (from context 110) was predominantly of outdoor forms, unlike typical pit fauna. The insect samples from the peat formation from sub-phase 31 were very small and were not clearly interpretable, but they were compatible with aquatic or marshy conditions.

Phase V : late 11th - early 12th century

74 (peat formation : sub-phase 35)

A small assemblage (11 individuals, 9 taxa) of typically urban medieval character was recorded.

118 (peat formation ; sub-phase 36)

The assemblage as supplied included 70 taxa; there were 110 individuals. Diversity was high and the proportion of outdoor individuals extremely so (%N OB = 64). Aquatics were important (%N W = 26, equivalent to 41% of the outdoor component), with waterside taxa well-represented (%N D = 11; 17% of the outdoor component). The abundance and diversity of these components leaves little doubt that deposition was aquatic, with weedy eutropic conditions. Further evidence was provided by resting

stages of what appeared to be the bryozoan Lophopus crystallinus. There was little evidence of human activity; synanthropes were absent and the decomposer component was tiny (%N RT = 16) and as compatible with natural litter as with the presence of man.

69 (peat formation in ditch : sub-phase 37)

The assemblage of 86 individuals included only 43 taxa, so diversity was estimated to be quite low (alpha = 34, SE 6); 62% of the individuals were outdoor (OB) forms, and aquatic and waterside species accounted for three-quarters of these. The most abundant taxon was a Philonthus, perhaps micans, a species found in marshy places. Among the aquatics, Tanysphyrus lemnae, found on duckweeds, and Cymbiodyta marginella,found in weedy stagnant water, were the most numerous. Bembidion ?assimile, Cercyon sternalis, C. marinus, C. tristis, and Notaris acridulus, among taxa from aquatic-marginal habitats, were all represented by two or more individuals. Many of the other taxa would be at home with these two groups. Weedy, still or sluggish water with much emergent vegetation, with litter and spongy vegetation at the margins, is suggested. There were no synanthropes.

70 (peat formation in ditch : sub-phase 37)

The small (S = 24, N = 27) assemblage was quite rich in outdoor forms (%N OB = 30), half of these being from aquatic or aquatic marginal habitats. While part of the decomposer fauna was reminiscent of that from many samples from medieval urban layers, all would be able to live in marshland litter.

Summary of Phase V

The fauna was predominantly associated with sluggish or still water with abundant vegetation, or with its margins. Three samples gave no indications of human presence, but a small fauna of urban character was present in the fourth.

Phase ?

864C

This sample, for which there was no archaeological information, provided a modest sized assemblage including some taxa not recorded from the remainder from the site. In ecological terms it was much like many of the others - a mixture of storage pests and other taxa typically found in deposits in buildings, with a variety of decomposers and outdoor forms.

General Comments

This was a fascinating group of assemblages, and it is a great pity that they were not extracted using standard techniques from standard 1kg samples and that time restraints necessitated very rapid examination. The material can only be used in a database for comparative purposes with caution as a result of the method of extraction, and it is most desirable that insects from any similar deposits which are excavated in the future are recorded in a standard manner. However, many groups of insects obtained from the samples had such a strong character that their implications were plain, especially when set together with the botanical evidence.

Acknowledgments

The authors would like to thank James Rackham and Dominique Vaughan for providing archaeological information. Ann Davis, Dominique Vaughan and various members of the Department of Urban Archaeology, Museum of London processed and sorted the original material. Remarks concerning treatment of the material are not intended to reflect badly on any individual, only on the circumstances under which the work was carried out.

References

Fisher, R. A., Corbet, A. S. and Williams, C. B., 1943. The relationship between the number of species and the number of individuals in a random sample of an animal population. Journal of Animal Ecology **12**, 42-58.

Kenward, H. K., 1978. The analysis of archaeological insect assemblages: a new approach. Archaeology of York **19**/1, 1-68. London, Council for British Archaeology.

Kenward, H. K., 1982. Insect communities and death assemblages, past and present, pp. 71-78 in A. R. Hall and H. K. Kenward (eds), Environmental archaeology in the urban context, Council for British Archaeology Research Report 43.

Kenward, H. K. and Williams, D., (1979). Biological evidence from the Roman warehouses in Coney Street. Archaeology of York **14**/2, 45-100. London, Council for British Archaeology.

Kloet,G. S. and Hincks, W. D., 1964. A check list of British insects, 2nd edn (revised), Part 1: Small orders and Hemiptera. London, Royal Entomological Society of London.

Kloet, G. S. and Hincks, W. D., 1977. A check list of British insects, 2nd edn (revised), Part 3: Coleoptera and Strepsiptera. London, Royal Entomological Society of London.

List of insects and other invertebrates recorded from Copthall Avenue, London. Nomenclature for the Hemiptera and Coleoptera follows Kloet and Hincks (1964 and 1977).

sp(p). indet. = record may include taxon listed above
sp(p). = taxon not listed above

Oligochaeta egg capsules

Crustacea:
- Cladocera sp. ephippia
- Ostracoda sp.

Diplopoda spp.

Dermaptera:
- Forficula auricularia Linnaeus
- Dermaptera sp. indet.

Mallophaga or Siphunculata sp.

Hemiptera:
- Eurydema oleracea (Linnaeus)
- Stygnocoris fuligineus (Geoffroy in Fourcroy)
- Scolopostethus sp.
- Lygaeidae sp.
- Lyctocoris campestris (Fabricius)
- Saldula sp.
- Saldidae sp. indet.
- Gerris sp.
- Auchenorhyncha spp.
- Aphidoidea sp.

?Lepidoptera sp. pupa

?Trichoptera sp. larval case

Diptera:
- Bibionidae sp.
- Sepsidae sp.
- Drosophilidae sp.
- Diptera sp. indet. larvae
- Diptera spp. indet. puparia
- Diptera spp. indet. adults

Syphonaptera sp.

Hymenoptera:
- Chalcidoidea sp.
- Proctotrupoidea sp.
- Parasitica spp. indet.
- Formicidae sp.
- Apis mellifera Linnaeus
- Hymenoptera sp., large black

Coleoptera:

- Clivina collaris (Herbst)
- Clivina fossor (Linnaeus)
- Trechus quadristriatus (Schrank)
- Trechus obtusus or quadristriatus
- Asaphidion flavipes (Linnaeus)
- Bembidion lampros or properans
- Bembidion ?assimile Gyllenhal
- Bembidion genei s. illigeri Netolitsky
- Bembidion biguttatum (Fabricius)
- Bembidion lunulatum (Fourcroy)
- Bembidion (Philochthus) sp.
- Bembidion spp. indet.
- Pterostichus ?cupreus (Linnaeus)
- Pterostichus melanarius (Illiger)
- Pterostichus nigrita (Paykull)
- Pterostichus spp. indet.
- Calathus sp.
- Agonum albipes (Fabricius)
- Agonum dorsale (Pontoppidan)
- Agonum marginatum (Linnaeus)
- Agonum ?muelleri (Herbst)
- Agonum ?moestum (Duftschmid)
- Amara sp.
- Bradycellus sp.
- Dromius ?meridionalis Dejean
- Metabletus ?foveatus (Fourcroy)
- Metabletus sp. indet.
- Carabidae spp. indet.
- Hydroporinae spp.
- Hygrotus ?inequalis (Fabricius)
- Agabus bipustulatus (Linnaeus)
- ?Agabus sp.
- Colymbetes fuscus (Linnaeus)
- Colymbetinae sp.
- Helophorus aquaticus or grandis
- Helophorus spp., small
- Coelostoma orbiculare (Fabricius)
- Sphaeridium bipustulatum Fabricius
- Sphaeridium ?lunatum Fabricius
- Sphaeridium scarabaeoides or lunatum
- Cercyon analis (Paykull)
- Cercyon atricapillus (Marsham)
- Cercyon haemorrhoidalis (Fabricius)
- Cercyon marinus Thomson
- Cercyon sternalis Sharp
- Cercyon terminatus (Marsham)
- Cercyon tristis (Illiger)
- Cercyon ustulatus (Preyssler)
- Cercyon spp. indet.
- Megasternum obscurum (Marsham)
- Cryptopleurum minutum (Fabricius)
- Hydrobius fuscipes (Linnaeus)
- Laccobius sp.
- Enochrus ?testaceus (Fabricius)
- Enochrus sp. indet.
- Cymbiodyta marginella (Fabricius)
- ?Hydrochara caraboides (Linnaeus)
- Hydrophilus piceus (Linnaeus)
- Hydrophilinae spp. indet.
- Acritus nigricornis (Hoffman)

Dendrophilus punctatus (Herbst)
Histerinae sp.
Ochthebius ?minimus (Fabricius)
Ochthebius sp.
Hydraena testacea Curtis
Limnebius sp.
Ptenidium spp.
Acrotrichis spp.
Ptiliidae sp.
Catops sp.
Catopinae spp. indet.
Silphidae sp.
Scydmaenidae sp.
Megarthrus sp.
Lesteva ?longoelytrata (Goeze)
Lesteva sp. indet.
Omalium ?rivulare (Paykull)
Omalium sp.
Xylodromus concinnus (Marsham)
Omaliinae sp. indet.
Carpelimus ?bilineatus Stephens
Carpelimus fuliginosus (Gravenhorst)
Carpelimus ?gracilis (Mannerheim)
Carpelimus pusillus (Gravenhorst)
Carpelimus pusillus group
Carpelimus bilineatus or rivularis
Carpelimus spp. indet.
Aploderus caelatus (Gravenhorst)
Platystethus alutaceus Thomson
Platystethus arenarius (Fourcroy)
Platystethus cornutus group
Platystethus nitens (Sahlberg)
Anotylus complanatus (Erichson)
Anotylus nitidulus (Gravenhorst)
Anotylus rugosus (Fabricius)
Anotylus sculpturatus group
Oxytelus laqueatus (Marsham)
Oxytelus sculptus Gravenhorst
Stenus spp.
Paederus sp.
Lathrobium sp.
Sunius sp.
Lithocharis ochracea (Gravenhorst)
?Astenus sp.
Paederinae sp.
Leptacinus ?pusillus (Stephens)
Leptacinus sp. indet.
Phacophallus parumpunctatus (Gyllenhal)
Gyrohypnus angustatus Stephens
Gyrohypnus fracticornis (Muller)
Xantholinus longiventris Heer
Xantholinus sp. indet.
Neobisnius villosulus (Stephens)
Neobisnius sp. indet.
Philonthus spp.
Gabrius sp.
Staphylininae spp. indet
Tachyporus ?hypnorum (Fabricius)
Tachyporus sp.
Tachinus laticollis Gravenhorst
Tachinus sp. indet.

Cilea silphoides (Linnaeus)
Tachyporinae sp. indet.
Cordalia obscura (Gravenhorst)
Falagria caesa Erichson
Falagria caesa or sulcatula
Aleochara spp.
Aleocharinae spp.
Pselaphidae sp.
Trox scaber (Linnaeus)
Geotrupes sp.
Aphodius contaminatus (Herbst)
Aphodius granarius (Linnaeus)
Aphodius prodromus (Brahm)
Aphodius spp.
Aphodius or Colobopterus sp.
Oxyomus sylvestris (Scopoli)
Onthophagus sp.
Melolonthinae/Rutelinae/Cetoninae sp.
Clambus sp.
Cyphon spp.
?Scirtidae sp.
Dryops sp.
Oulimnius sp.
Elateridae spp.
Trixagus sp.
Cantharidae sp.
Anthrenus sp.
Stegobium paniceum (Linnaeus)
Anobium punctatum (Degeer)
Tipnus unicolor (Piller and Mitterpacher)
Ptinus fur (Linnaeus)
Ptinus spp. indet.
Ptinidae spp. indet.
Lyctus linearis (Goeze)
Brachypterus sp.
Meligethes sp.
Omosita sp.
Monotoma bicolor Villa
Monotoma longicollis Gyllenhal
Monotoma ?picipes Herbst
Monotoma sp. indet.
Cryptolestes ferrugineus (Stephens)
Oryzaephilus surinamensis (Linnaeus)
Cryptophagus scutellatus Newman
Cryptophagus spp.
Atomaria nigripennis (Kugelann)
Atomaria spp.
Ephistemus globulus (Paykull)
Phalacrus ?substriatus Gyllenhal
Phalacrus sp. indet.
?Sericoderus lateralis (Gyllenhal)
Orthoperus spp.
?Hippodamia tredecimpunctata (Linnaeus)
Anisosticta novemdecimpunctata (Linnaeus)
Coccinellidae sp.
Lathridius minutus group
Enicmus sp.
Dienerella sp.
Lathridiinae sp. indet.
Corticaria sp.
Cortinicara gibbosa (Herbst)

Corticaria or Cortinicara sp. indet.
Corticarina or Cortinicara sp. indet.
Typhaea stercorea (Linnaeus)
Aglenus brunneus (Gyllenhal)
Blaps sp.
Tribolium sp.
Palorus ratzeburgi (Wissman)
Tenebrio obscurus Fabricius
Anthicus formicarius (Goeze)
Anthicus sp. indet.
Phymatodes alni (Linnaeus)
Bruchus sp.
Bruchinae sp. indet.
Donacia sp.
Donaciinae spp. indet.
Oulema ?melanopa (Linnaeus)
Lema or Oulema sp.
Gastrophysa viridula (Degeer)
Phaedon sp.
?Hydrothassa sp.
Prasocuris phellandrii (Linnaeus)
Chrysomelinae spp. indet.
Phyllotreta sp.
?Longitarsus sp.
Altica sp.
Chaetocnema arida group
Chaetocnema concinna (Marsham)
Halticinae sp. indet.
Chrysomelidae sp. indet.
Apion radiolus (Marsham)
Apion ?urticarium (Herbst)
Apion pomonae (Fabricius)
Apion nigritarse Kirby
Apion spp.
Phyllobius or Polydrusus sp.
Strophosomus nebulosus Stephens
Strophosomus sp. indet.
Cneorhinus plumbeus (Marsham)
Sitona hispidulus (Fabricius)
Sitona ?lepidus (Gyllenhal)
Sitona ?lineatus (Linnaeus)
Sitona sp. indet.
Hypera punctata (Fabricius)
Tanysphyrus lemnae (Paykull)
Sitophilus granarius (Linnaeus)
Bagous sp.
?Hydronomus alismatis (Marsham)
Notaris acridulus (Linnaeus)
Notaris scirpi (Fabricius)
Erirhininae sp.
Cidnorhinus quadrimaculatus (Linnaeus)
Ceutorhynchus ?contractus (Marsham)
Ceutorhynchus ?erysimi (Fabricius)
Ceutorhynchus spp.
Rhinoncus perpendicularis (Reich)
Phytobius sp.
Ceuthorhynchinae sp. indet.
Anthonomus pomorum (Linnaeus)
Gymnetron spp.
Curculionidae spp. indet.
Scolytidae spp.

Coleoptera spp. indet.
Coleoptera spp. indet. larvae

Insecta sp. indet. larvae

Arachnida:
Acarina spp.
Aranae sp.

Gastropoda sp.

Bryozoa:
?Lophopus sp., resting eggs

?egg masses