

HB/P

Austin Friars: the environment of a Medieval Friary

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At the site of the excavation of the Medieval Friary at Austin Friars, Leicester, macroscopic plant and animal remains have been recovered from two series of samples from the infills of ditches II and IV. The resulting plant, insect and mollusc assemblages have provided overlapping information about the environment of the priory and the surrounding area. The limited occurrence within the samples of important indicator species suggest environmental changes which are supported by overall faunal and floral variations.

Recovery methods

Samples for environmental analysis were collected by Miss J. Mellars. The stratigraphy of the waterlogged deposits was recorded and samples of approximately 2 kgs. were taken vertically through the sections. These were placed in labelled polythene bags and stored in a deep freeze. The generally good preservation of all biological material subsequently recovered from the samples indicated that freezing did not damage the remains and it prevented drying out of the samples, a particularly damaging process for insect remains.

All samples were subjected to the paraffin flotation technique (Coope and Osborne 1967). The samples were disaggregated in warm water, washed through 300 micron sieves and the retained

fraction was drained, mixed thoroughly with paraffin then cold water was added. After allowing the sample to settle, the flotant was poured into the sieve, washed in detergent followed by alcohol and finally sorted under a binocular microscope. Shells, insect sclerites and plant remains were recovered in this fashion. The technique did not, however, successfully recover heavier plant remains such as nuts and dense seeds or robust or sediment filled shells, therefore, after the samples had been subjected to several cycles of the treatment, the non-floating residues were washed through a graded series of sieves and the remaining fractions were sorted for these heavier biological remains.

The botanical remains were identified by Miss P. Paradine, Mollusca jointly by Mr T. O'Connor and the author and Insecta by the author. All identified material has been stored in 100% alcohol.

The list of species from each of the Austin Friars samples is given in appendix 1. The nomenclature for the flora follows Clapham, Tutin and Warburg (1962), that of the Mollusca, Ellis (1969) and McMillan (1968) and Coleoptera follow Pope's 1977 revision of Kloet and Hincks. The numbers given for each of the samples represents a minimum total based upon common identified parts.

Identifications of special interest

Generally the good state of preservation of most of the biological remains permitted precise identification except in the case of damaged specimens. Several of the taxa identified from this site are worthy of attention; notes on these are given below.

Thuja plicata. A single, well preserved fruit recovered from sample 4 of ditch II has been identified as Thuja, probably T. plicata, The Western Red Cedar. This is a N. American species introduced to Britain in 1853 (Mitchell 1974) and the fruit ~~is~~ recorded from the sample is likely to be of modern origin.

Trichotropis borealis. From sample 6, ditch II, in which a concentration of marine shells was recorded, a small fragment was recovered of a thick-walled shell in which the periostracum (outer horny layer) was produced into short projections on the ribs. This has been matched with a specimen of Trichotropis borealis, a marine species which today extends as far south as the Dogger Bank and which is collected by dredging.

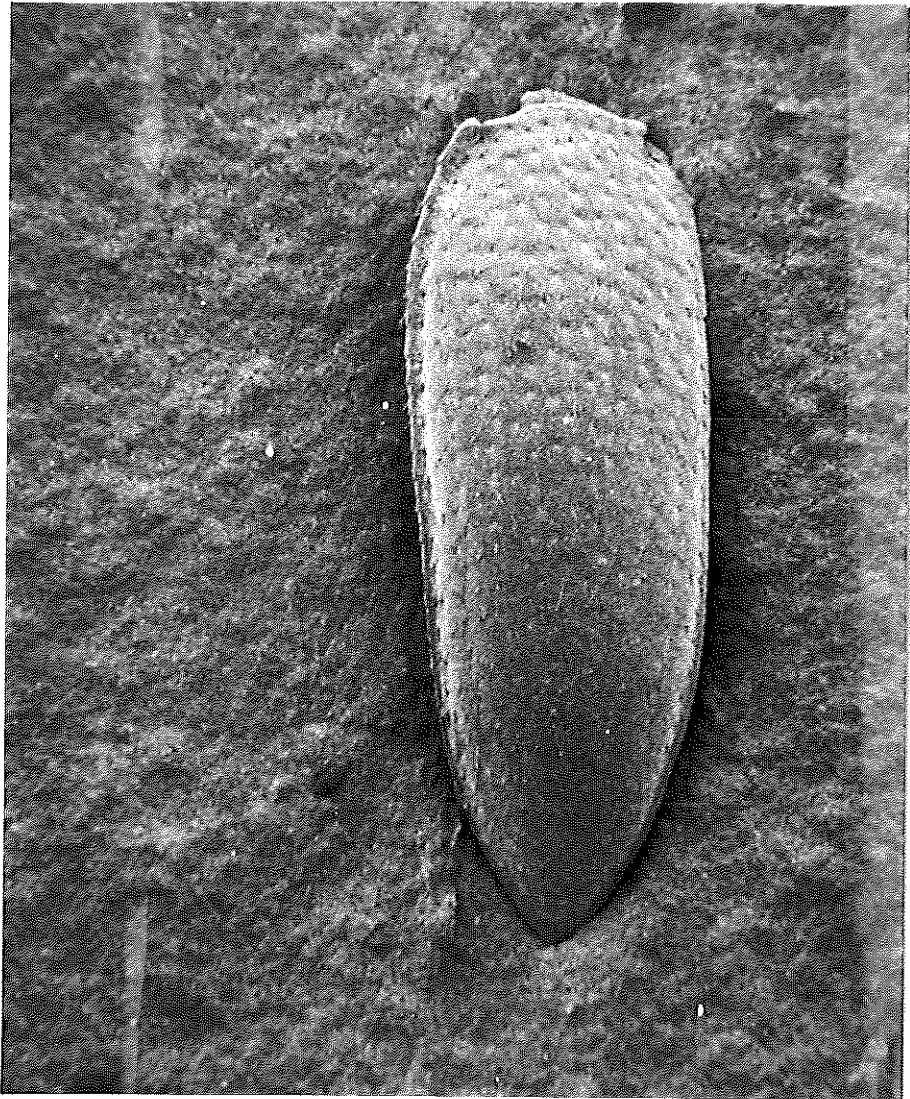
Theodoxus fluviatilis. Amongst the gastropods which are confined to hard water are several examples of this characteristically shaped species, which is also known as the slipper limpet.

Gyrinus strigulosus. Two well preserved elytra (wing-cases) of a species of Gyrinus; the "whirly-gig" beetles, exhibited a pattern of oblique strigulation over the whole surface which clearly separated them from any British species. They were eventually matched at the British Museum of Natural History with Central European representatives of G. strigulosus. As the name suggests, strigulosus is characterised by fine strigulation, the feature displayed in the Austin Friars specimen. The related species, G. colymbus does today occur in Britain, although it is exceedingly rare (Balfour-Browne 1950) but no record has ever been made of strigulosus. As this species is sufficiently different from all British representatives not to escape attention, its

absence is likely to be a true feature in which case, the beetle has become extinct in Britain during the last four hundred years. Studies of a number of sites have provided a list of about twenty species of beetles which no longer live in Britain. Their disappearance has been attributed to two main factors; climatic change and forest clearance (Osborne, 1965, 1976). The Austin Friars record is of particular significance as it represents the only post-Roman extinction so far known. The most probable explanation for the disappearance of this species is a climatic deterioration which wiped out the British population, and elsewhere the "Little Ice-Age" is suggested as the likely time at which this occurred (Girling 1978). Within the limitations of arguing from a single species, the presence of G. strigulosus in Medieval Leicester does suggest that the climate is unlikely to have been colder than that of the area today, an inference supported by other beetles which live wholly or predominantly in the southern half of the country.

Aglenus brunneus. A large proportion of the beetles from the site display varying degrees of synanthropy. Many of these are species which occur naturally in Britain but which are favoured by man's activities in providing alternative, widespread habitats such as Mycetaea hirta (Plate I). Other species are more directly dependent upon man, and amongst these are beetles imported into this country in foodstuffs and other materials. One such species is Aglenus brunneus, a small blind beetle found in rotting vegetation and other materials and which has been recorded in several Roman and later archaeological deposits. Its spread into this country has been documented from archaeological evidence by Kenward (1975, 1976) who has demonstrated that the theory that the species is a recent import from the New World

Plate I



Mycetaea hirta

left elytron

Scanning electron micrograph, X 100

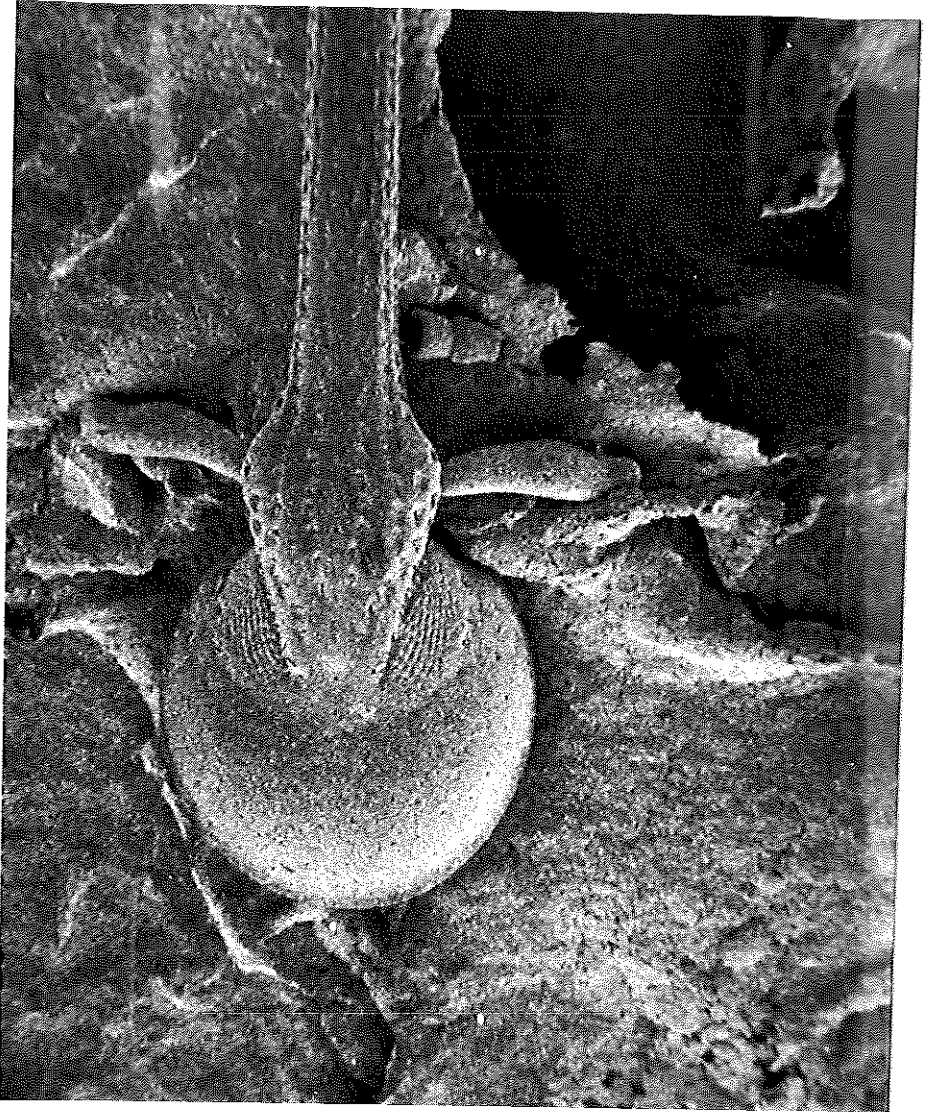
is untenable, but rather, that British populations of the beetle have resulted from infested cargoes from Europe. Two other imported pests species at Austin Friars, Sitophilus granarius, the grain weevil and Oryzaephilus surinamensis, the saw-toothed grain beetle, are both commonly encountered in most urban archaeological deposits from the Roman Period onwards. These species are illustrated in plates II and III.

The environment and environmental changes

The seed, insect and mollusc assemblages provide a mosaic of evidence from in and around the site. The strongest indications are of the nature of the receiving deposit, in this case the ditches, and remains of ditch-living and aquatic plants, snails and insects are present in most samples. The remainder of these assemblages have been derived from the surrounding area, notably from buildings or other structures as evidenced by the presence of household pests which are flightless and which therefore are likely to have been living in the immediate area, and from the surrounding fields.

The assemblages from the two ditches indicate a similar environment for each. The freshwater molluscs which have precise pH requirements favour hard to neutral water and include Bythnia tentaculata, B. leachi Lymnaea auricularia and Acroloxus lacustris. The species are divided between those preferring flowing water, such as B. leachi and Valvata piscinalis and others which live in still and often vegetated water. The latter group includes Planorbis contortus and P. planorbis. Another species commonly found in marshy situations is Lymnaea palustris. Seeds have been recovered from a number of typical pond or stream bank plants including

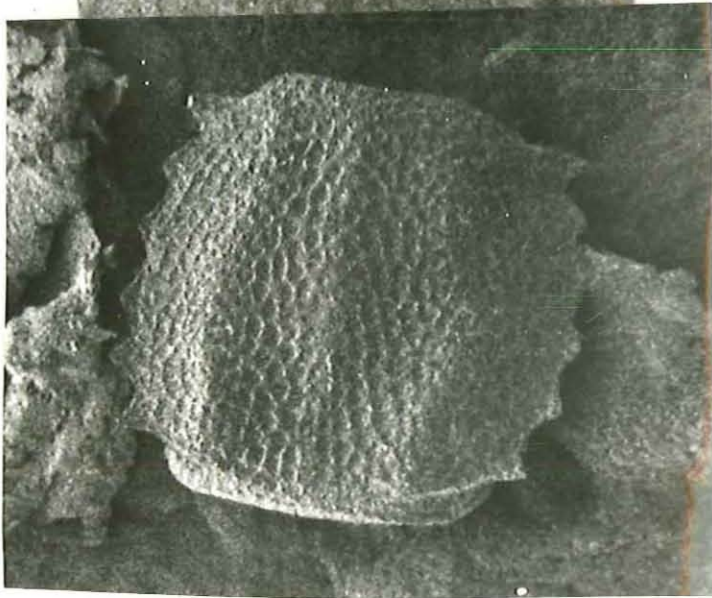
Plate II



Sitophilus granarius

head

Scanning electron micrograph, X 100



Oryzeaphilus surinamensis

a) head b) pronotum c) left elytron Scanning electron micrograph, X

Brassica nigra (black mustard), Mentha aquatica (water mint), Alisma plantago-aquatica (water-plantain) and reeds and sedges. Several water-beetles are present including Colymbetes fuscus and species of Gyrinus, both of which swim in stretches of open water and there are also numbers of pondside species which live in damp mud and vegetation at the water's edge. Helophorus spp. and other species of Hydrophilidae provide examples of these. The environmental remains support the conclusion from archaeological evidence that the ditches originally formed a moat around the site.

Plants and weeds indicate that the land bordering the ditches was made up of both wet meadows and drier areas some of which were cultivated Agrostemma githago (corncockle) is notable as a cornfield pest. Whether or not cereals were grown in the area, there is insect evidence of ~~its~~ storage. Other weeds of cultivated land include Torilis nodosa (knotted hedge-parsley), Lithospermum arvense (corn Gromwell) and Plantago major (plantain). Legume cultivation is indicated by the occurrence of Bruchus rufimanus the bean beetle. Other beetles which are found on cultivated soils include Pterostichus madidus, Agonum muelleri and Amara familiaris.

Various indicators of wet-meadow and other grassland may be correlated with the evidence from animal associated insects to indicate grazing in the area. Typical damp meadow plants include Lychnis flos-cuculi (ragged robin) whereas Ranunculus bulbosus (bulbosus buttercup) is usually found in drier pastures. The terrestrial gastropod Vallonia excentrica is often taken in dry fields where it lives under stones or at grass roots. The presence of grazing

animals is suggested by about fifty individuals of Aphodius,^{ff} dung beetles. Other species which are often found in dung include numbers of Anotylus species, Coprophilus striatulus and Platystethus arenarius. Dung also provides a suitable habitat for Sphaeridium scaraboides and Cercyon spp. Records have also been made of two other animal-associated species, carrion feeders; Trox scaber which feeds on bones and skins and Catops or Choleva sp.

The pattern of agricultural and pastoral land use is completed by suggestions of limited areas of hedgerow or small copses. The bark beetle Leperisimus varius feeds on various trees including oak and the mollusc Zonitoides excavatus is often found in dead wood or leaves in woods. The ground beetle Bembidion harpaloides is also a typical inhabitant of woods where it is frequently found in trees or under bark. It is relevant to note that as well as the independent lines of evidence supporting similar conclusions for land use, there are indications of interdependence between the plant and animal groups, and a number of plants represented by seeds or other remains are host species to ^{the} phytophagous element of the beetle fauna.

An important source of information about activities in the habitation site is provided by the beetle fauna and several aspects of life are evidenced by components of this fauna. The cereal pests S. granarius and O. surinamenis indicated that cereals were stored on the site, the former feeding on whole grains whilst the latter is restricted to damaged or insect and fungus-infested stores or to flour and other cereal products.

Records of such infestations are common from archaeological deposits from urban areas and it is possible that since the introduction of the pests in Roman times and before the advent of modern insecticides that most grain stores have supported populations of these beetles. Both species regularly overwinter in buildings in Britain and S. granarius is capable of overwintering in unheated buildings, (Solomon and Adamson 1955). As well as grain storage areas, most habitation sites would provide a variety of buildings, stables and even bird cotes which would supply suitable habitats where the species could survive during periods of cleaning or rebuilding of storage areas, and these surviving populations provide centres from which infestation of new grain stores can take place. In this way, continuous infestation is maintained.

Some significance may be attached to the absence of other insect pests, particularly those whose attacks follow infestation by such species as S. granarius. These include species of Tenbrionidae which feed on moulds or fungi growing on insect damaged cereal, and which are especially common in food stores, granaries and maltings. It is possible that the absence of this type of insect indicates that the grain-storage areas were well-planned and/or frequently swept out to prevent any build-up of these pests.

The orderliness apparent in grain storage appears to extend over much of the habitation site. Household pests are present; in addition to the imported insects other records include Niptus unicolor, a common inhabitant of houses and larders and Mycetaea hirta, a species usually found in haystacks, flooring, stables and other buildings. Such

records in Austin Friars, however, are much scarcer than are usually found in urban archaeological deposits. A possible explanation for this is that the receiving deposit is removed from the actual buildings whereas in other sites, such as the Viking excavations at Lloyds Bank, York, the sample material consisted of waterlogged layers of actual flooring (Buckland, Greig and Kenward, 1972) and elsewhere, rubbish pits often provide a likely source of environmental material. In these cases, the indigenous rotten vegetation/dung/household pest element of the fauna is always abundantly represented. The presence in the Austin Friars ditches of S. granarius, O. surinamensis and A. brunneus, beetles which are flightless, does however indicate that a proportion of the fauna from the buildings is reaching the deposit and hence the assemblage may provide a valid basis from which inferences may be made on the general site conditions. If the fauna is representative of the whole site it indicates that as well as a well-planned drainage system and good storage conditions, the priory's occupants enjoyed a higher standard of cleanliness within and around the buildings than is usually encountered in urban sites of similar age.

There is no direct evidence from the insect fauna as to whether animals were stalled in or around the priory, although hay, bedding and stable sweepings may have provided a habitat for numbers of the insects, especially the Staphylinidae. The significance of the animal bones recovered from the site are discussed elsewhere in this report by . In addition to the stores of cereals and other plants, another source of food is indicated by the remains of marine molluscs imported to the site. Three species; Ostrea edulis, the oyster, Mytilus edulis, the mussel and Cerastoderma edule, the cockle may have

been important. In addition the freshwater swan mussels which probably lived in nearby rivers may also have been gathered for food.

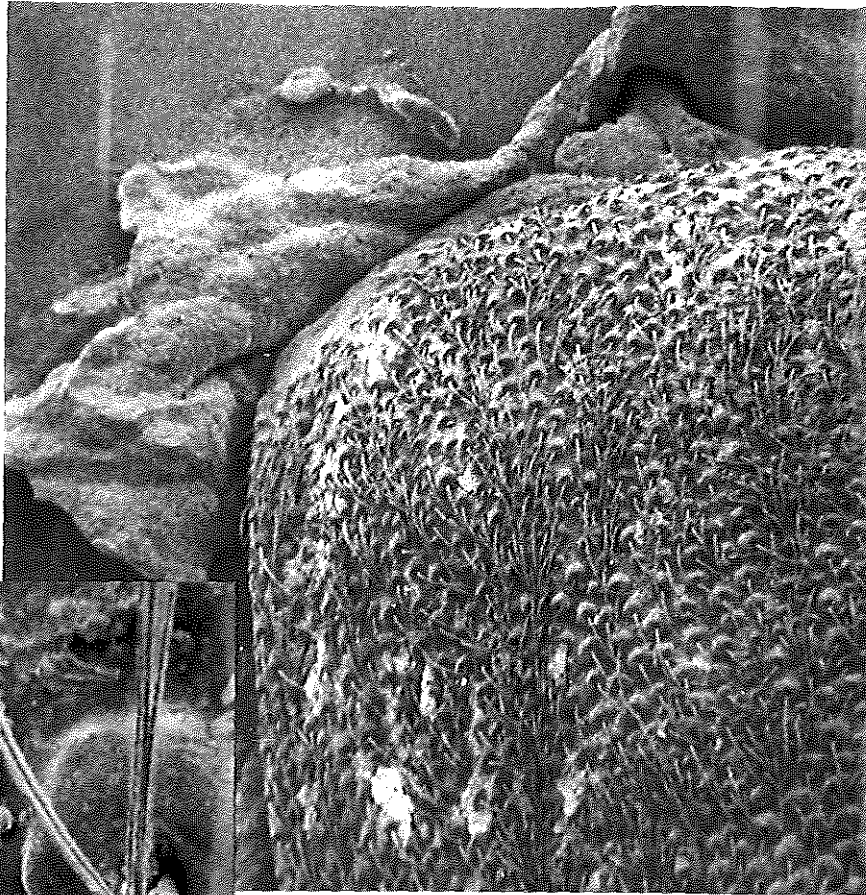
in the samples of numbers of
Records of wood-boring insects which can cause serious damage to dry timber indicate its use as building material. The most serious pest is Xestobium rufovillosum, the death watch beetle. ^(Plate IV) The two tree species most commonly attacked in the wild are oak and willow, although a variety of other species, including beech, are also affected. Indoors, the most frequently infested timber is oak, (Hickin, 1968). Buckland (1975) discussing the role of synanthropy in the spread of the beetle, has suggested that records of the species in the northern half of the country have resulted from the transport of already infested timber.

The related species, Anobium punctatum, the woodworm or furniture beetle is a very widespread pest of dry timber, attacking both hardwood and softwood. It is represented by 21 individuals from both ditches. Another timber pest, Lyctus linearis, the powder post beetle, attacks hardwoods, oak and ash being particularly susceptible. Also present Grynobius planus, a species often found in dry trunks, stumps and in fence-posts but which is not a serious indoor pest in Britain.

Environmental change

The most notable feature from both ditches is the evidence of flooding which is followed by a reduction in numbers of synanthropic species. Indications of this are particularly obvious in ditch II. Here, the greatest number of synanthropes occur at the base of the deposit. Accompanying these species are wood-borers, a strong water-side element probably derived from the banks of the river supplying

Plate IV



Xestobium rufovillosum

a) elytral base (X 100)

b) detail of a) showing mammillate punctures with setae (X 1000)

Scanning electron micrographs

the drainage water, and low numbers of dung beetles. A similar fauna which also includes several synanthropic ground beetles, has been recorded from the next samples. Higher in the section, open water aquatics are recorded. At the level of sample 6 there is an appearance of a running water element, typical running water animals including Aulimnius troglodytes and the mollusc Ancylastrum fluviatile which is usually found on stones and wood in running water. This species is one of a number of molluscs confined to sample 6 which yielded a much greater concentration of shell remains than any other sample. The records of terrestrial snails and the inclusion in the sample of edible marine species suggests that the surrounding land and possibly part of the site were inundated. After the flooding phase, two main elements remain in the beetle fauna; aquatic species which include those living in open water and dung feeding and associated species. There is an absence of household pests, food-storage species and other synanthropic species. Even those plants which can indicate the activities of man are almost absent.

In ditch IV, numbers of synanthropic beetles are lower than in ditch II, and the maximum coincides with the samples which indicate the flooding phase. This suggests that ditch IV was further removed from the building, a factor borne out by excavations, and that most of the synanthropes were introduced by flooding of the site. As in ditch II the flooding is marked by running water species such as Potamonectes depressus elegans and Stictotarsus duodecimpunctatus, accompanied by other aquatics such as Gyrinus marinus. The productivity of the samples of ditch IV are highest at this flooding level. After this phase, a few aquatics and numbers of dung feeding,

beetles
dung-associated and a carrion feeder are present in the two upper samples, together with a single death watch beetle, but as in ditch II there are no food or household pest insects. The environmental and changes indicated by the seeds, molluscs and beetles are summarised in table I.

Conclusion

Seeds, molluscs and insects recovered from samples of the infill of two ditches at Austin Friars provide overlapping evidence of pastoral and agricultural activities around the site, and of a variety of activities at the Friary which include grain storage and the importation of marine shellfish. The insect evidence suggests that a higher standard of cleanliness than is usual for urban sites of this age was enjoyed by the inhabitants. A major phase of flooding is apparent from both ditches and the absence of synanthropic species after this phase suggest little, if any, subsequent occupation of the site although the surrounding fields continued to be grazed.

DITCH II SAMPLE NO	Flooding Site Water Indicators	Overall Environment
9		
8	Oys	Open pasture and meadow species predominate and there are few signs of the formerly important habitation site element.
7		
6	Oys unring Sw Coop ter	flooding horizon
5		
4		
3		
2		Indicators of the habitation site are important, particularly in lowest levels where grain pests are numerous.
1		
DITCH IV SAMPLE NO 6		
5		Flora and fauna derived from surrounding pasture land.
4	over umbers of pecies	
3	umbers f species	Flooding horizon
2	usse	
1	Coockl usse	Fewer indicators than in Ditch II of habitation site, possibly because this ditch is further removed from this area.

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Appendix

Species list of plants, molluscs and insects
from Austin Friars.

Numbers for each taxon represent a minimum based upon
commonly recorded remains.

Key for plant remains.

- a achene
- f fruit
- fs fruit segment
- fa fruit achene
- g grain
- m mericarp
- n nutlet
- s seed
- t stone

NAME	II									IV						TOTAL
	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	
FLORA																
CUPRESSACEAE																
<u>Thuja ?plicata</u> Lam.	-	-	-	1f	-	-	-	-	-	-	-	-	-	-	-	1
RANUNCULACEAE																
<u>Ranunculus repens</u> L.	-	-	-	-	12a	-	-	-	-	-	-	-	-	-	100a	112
<u>R. bulbosus</u> L.	1a	3a	1a	1a	1a	-	-	1a	-	2a	9a	9a	3a	3a	45a	78
<u>R. hederaceus</u> L.	-	1a	1a	-	-	-	-	-	-	-	-	-	-	-	-	2
<u>Ranunculus</u> sp.	-	-	4a	-	-	1a	1a	-	-	-	-	-	-	-	-	6
PAPAVERACEAE																
<u>Papaver rhoeas</u> L.	-	-	1s	1s	-	-	-	1s	1s	-	-	2s	2s	1s	6s	15
CRUCIFERAE																
<u>Brassica nigra</u> (L.) Koch	-	-	-	3s	4s	3s	-	-	-	-	1s	4s	2s	-	-	17
<u>Brassica</u> sp.	-	1s	-	-	-	-	-	-	-	-	-	-	2f	-	-	3
<u>Sinapsis arvensis</u> L.	-	1s	-	-	-	-	-	-	-	-	-	-	-	-	-	1
<u>Capsella bursa-pastoris</u> (L.) Medoc	-	-	2s	3s	-	-	-	-	-	-	-	-	-	-	-	5
<u>Rorippa nasturtium-aquaticum</u> (L.) Hayek	-	-	1s	-	-	-	-	-	-	-	-	-	-	-	-	1
<u>Sisymbrium officinale</u> (L.) Scop.	-	-	1s	-	-	-	-	-	-	-	-	-	-	1s	-	2

1 2 3 4 5 6 7 8 9 1 2 3 4 5 6

CARYOPHYLLACEAE

Lychnis flos-cuculi L.

- - - 1s - 1s - - 1s - - - 1s 4

Agrostemma githago L.

- - - - - - - - - - - 1s 1s - - 2

Cerastium sp.

- 1s 2s 1s - 5s - - - - 2s 1s - ?2s 2s 16

Stellaria media (L.) Villa

1a - 4s 9s 6s 3s - 2s 9s - 6s - 2s - 2s 44

S. graminea L.

- - - - 1s - - - - - - - - 1

Stellaria sp.

- - - - - - - - - - - 1s - - 1

?Arenaria sp.

- 1s - - 2s 6s - - - - - - - 1s 10

CHENOPODIACEAE

Chenopodium album L.

- - 1s 1s - 7s - - 2s - - 2s 10s 3s 12s 38

Atriplex patula L.

- 2s - - - - - - - - - - - 2

MALVACEAE

Malva silvestris L.

- ?1s - - - 2s - 1s 1fs - 1s - 1f - - 6

GERANIACEAE

?Geranium dissectum L.

- 2s - - - - - - - - - - - 2

ROSACEAE

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 1 | 2 | 3 | 4 | 5 | 6 | |
|-------------------------------|----|---|---|---|---|----|---|---|----|---|---|----|----|----|----|---|
| <u>Rubus fruiticosus</u> agg. | - | - | - | - | - | 3s | - | - | - | - | - | - | - | 1p | - | 4 |
| <u>Potentilla</u> sp. | - | - | - | - | - | 1a | - | - | 1a | - | - | 1a | 1a | - | 5a | 9 |
| <u>Prunus spinosus</u> L. | - | - | - | - | - | - | - | - | - | - | - | - | - | 1t | - | 1 |
| <u>P. ?avium</u> (L.) L. | 1t | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 |

ONOGRACEAE

| | | | | | | | | | | | | | | | | |
|----------------------|---|----|---|----|---|---|---|---|---|---|---|---|---|----|---|---|
| <u>Epilobium</u> sp. | - | 1s | - | 1s | - | - | - | - | - | - | - | - | - | 1s | - | 3 |
|----------------------|---|----|---|----|---|---|---|---|---|---|---|---|---|----|---|---|

UMBELLIFERAE

| | | | | | | | | | | | | | | | | |
|------------------------------------|---|---|----|----|---|---|----|----|---|---|---|----|----|----|---|----|
| <u>Torilis nodosa</u> (L.) Gaertn. | - | - | - | - | - | - | - | - | - | - | - | - | - | 4m | - | 4 |
| <u>Aegopodium podogarra</u> L. | - | - | - | - | - | - | - | - | - | - | - | 9m | 4m | - | - | 11 |
| <u>Aethusa cynapium</u> L. | - | - | - | 3m | - | - | - | - | - | - | - | - | - | - | - | 3 |
| <u>Heracleum spondylium</u> L. | - | - | 1m | - | - | - | - | - | - | - | - | 1m | - | - | - | 2 |
| Umbelliferae <u>indet.</u> | - | - | - | - | - | - | 1m | 1m | - | - | - | - | - | - | - | 2 |

POLYGONACEAE

| | | | | | | | | | | | | | | | | |
|--------------------------------------|---|-----|----|----|----|----|---|----|---|-----|---|----|-----|----|----|----|
| <u>Polygonum aviculare</u> L. | - | - | 1a | - | - | 9a | - | 1a | - | 71p | - | 4a | - | 1a | 3a | 50 |
| <u>P. persicaria</u> L. | - | - | - | - | - | - | - | - | - | - | - | 3a | - | - | - | 3 |
| <u>P. (=Bilderdykia) convulus</u> L. | - | - | - | 1a | - | 1a | - | - | - | - | - | 1a | - | - | 6a | 9 |
| <u>Rumex acetocella</u> L. | - | 1a | - | - | - | - | - | - | - | - | - | 4a | 12a | - | - | 17 |
| <u>R. crispus</u> L. | - | 71f | 3f | - | 2a | - | - | - | - | - | - | 2a | 41a | 3a | 1a | 53 |
| <u>R. obtusifolius</u> L. | - | - | - | - | - | 1a | - | - | - | 1a | - | - | 5a | - | - | 7 |
| <u>Rumex</u> sp. | - | - | - | - | - | 2a | - | - | - | - | - | - | 2a | - | - | 4 |

1 2 3 4 5 6 7 8 9 1 2 3 4 5 6 -

URTICACEAE

| | | | | | | | | | | | | | | | | | |
|------------------------|----|-----|-----|------|------|----|---|---|-----|---|---|----|-----|-----|----|-----|-----|
| <u>Urtica urens</u> L. | - | - | - | - | 15a | 7a | - | - | - | - | - | - | 3a | - | - | 25 | |
| <u>U. dioica</u> L. | 4a | 46a | 69a | 110a | 380a | - | - | - | - | - | - | 6a | 13a | 12a | 7a | 22a | 669 |
| <u>Urtica</u> sp. | - | - | - | - | - | - | - | - | 1fa | - | - | - | - | - | - | - | 1 |

PRIMULACEAE

| | | | | | | | | | | | | | | | | |
|------------------------------|---|----|---|---|---|---|---|---|---|---|---|----|----|---|---|---|
| <u>Anagallis arvensis</u> L. | - | 1s | - | - | - | - | - | - | - | - | - | 1s | 3s | - | - | 5 |
|------------------------------|---|----|---|---|---|---|---|---|---|---|---|----|----|---|---|---|

BORAGINACEAE

| | | | | | | | | | | | | | | | | |
|--------------------------------|---|----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <u>Lithospermum arvense</u> L. | - | 2n | - | - | - | - | - | - | - | - | - | - | - | - | - | 2 |
|--------------------------------|---|----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

LABIATE

| | | | | | | | | | | | | | | | | |
|---------------------------|---|---|---|---|----|---|---|---|---|---|---|---|---|---|---|---|
| <u>Mentha aquatica</u> L. | - | - | - | - | 1n | - | - | - | - | - | - | - | - | - | - | 1 |
|---------------------------|---|---|---|---|----|---|---|---|---|---|---|---|---|---|---|---|

| | | | | | | | | | | | | | | | | |
|-----------------------------|---|---|---|----|---|---|---|---|---|---|---|----|---|---|----|---|
| <u>Prunella vulgaris</u> L. | - | - | - | 1n | - | - | - | - | - | - | - | 2n | - | - | 6n | 9 |
|-----------------------------|---|---|---|----|---|---|---|---|---|---|---|----|---|---|----|---|

| | | | | | | | | | | | | | | | | |
|----------------------|---|---|---|---|---|---|---|---|---|---|----|---|---|---|---|---|
| ? <u>Stachys</u> sp. | - | - | - | - | - | - | - | - | - | - | 1n | - | - | - | - | 1 |
|----------------------|---|---|---|---|---|---|---|---|---|---|----|---|---|---|---|---|

| | | | | | | | | | | | | | | | | |
|-------------------------|---|---|---|---|----|----|---|----|---|---|---|---|---|---|----|----|
| <u>Ballota nigra</u> L. | - | - | - | - | 1n | 1n | - | 2n | - | - | - | - | - | - | 6n | 10 |
|-------------------------|---|---|---|---|----|----|---|----|---|---|---|---|---|---|----|----|

| | | | | | | | | | | | | | | | | |
|-------------------------|---|---|---|----|---|---|---|---|---|---|---|---|---|---|---|---|
| <u>Lamium ?album</u> L. | - | - | - | 1n | - | - | - | - | - | - | - | - | - | - | - | 1 |
|-------------------------|---|---|---|----|---|---|---|---|---|---|---|---|---|---|---|---|

| | | | | | | | | | | | | | | | | |
|------------------------|---|----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <u>L. purpureum</u> L. | - | 2n | - | - | - | - | - | - | - | - | - | - | - | - | - | 2 |
|------------------------|---|----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| | | | | | | | | | | | | | | | | |
|------------------------------|---|---|---|---|---|---|---|---|---|---|---|----|---|---|---|---|
| <u>Galeopsis tetrahit</u> L. | - | - | - | - | - | - | - | - | - | - | - | 6n | - | - | - | 6 |
|------------------------------|---|---|---|---|---|---|---|---|---|---|---|----|---|---|---|---|

| | | | | | | | | | | | | | | | | |
|-----------------------|---|---|----|----|----|----|---|---|----|---|---|----|----|---|----|----|
| Labiata <u>indet.</u> | - | - | 2n | 2n | 4n | 3n | - | - | 1n | - | - | 2n | 1n | - | 2n | 17 |
|-----------------------|---|---|----|----|----|----|---|---|----|---|---|----|----|---|----|----|

PLANTAGINACEAE

| | | | | | | | | | | | | | | | | |
|--------------------------|---|---|----|----|---|---|---|---|---|---|---|---|---|---|---|---|
| <u>Plantago major</u> L. | - | - | 2s | 1s | - | - | - | - | - | - | - | - | - | - | - | 3 |
|--------------------------|---|---|----|----|---|---|---|---|---|---|---|---|---|---|---|---|

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 1 | 2 | 3 | 4 | 5 | 6 | |
|---|----|----|----|----|----|----|---|----|----|---|----|----|-----|----|----|----|
| RUBIACEAE | | | | | | | | | | | | | | | | |
| <u>Galium</u> sp. | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1m | 1 |
| CAPRIFOLIACEAE | | | | | | | | | | | | | | | | |
| <u>Sambucus nigra</u> L. | - | - | - | - | 2s | 1s | - | - | 2s | - | - | - | - | 1s | 4s | 10 |
| VALERIANACEAE | | | | | | | | | | | | | | | | |
| ? <u>Valerianella dentata</u> (L.) Poll. | - | - | - | - | - | - | - | - | - | - | 1s | - | - | - | - | 1 |
| DISPACACEAE | | | | | | | | | | | | | | | | |
| <u>Dispacus fullonum</u> L. ssp <u>fullonum</u> | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1f | 1 |
| COMPOSITAE | | | | | | | | | | | | | | | | |
| <u>Anthemus cotula</u> L. | - | 1a | 2a | 3a | 1a | 2a | - | - | 1a | - | 1a | 5a | 15a | - | - | 31 |
| <u>Chrysanthemum segetum</u> L. | - | - | - | - | - | 1a | - | 1a | - | - | - | 6a | 3a | - | - | 11 |
| <u>Arcticum lappa</u> L. | 1a | - | - | - | - | 3a | - | - | - | - | - | - | 6a | - | 1a | 1f |
| <u>Carduus</u> sp. | - | - | - | - | - | - | - | - | - | - | - | 1a | - | - | 1a | 2 |
| <u>Cirsium</u> sp. | - | - | - | - | - | 1a | - | - | - | - | - | - | 3a | - | - | 4 |
| <u>Centaurea scabiosa</u> L. | - | - | - | - | - | 3a | - | - | - | - | - | - | - | - | - | 3 |
| <u>Picris echinoides</u> L. | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1a | 1 |
| <u>Sonchus arvensis</u> L. | - | - | - | - | - | - | - | - | - | - | - | 1a | - | - | - | 1 |
| <u>S. asper</u> (L.) Hill. | - | - | - | - | - | - | - | - | - | - | - | 2a | - | - | - | 2 |
| <u>Crepis</u> sp. | - | 2a | - | 3a | - | 1a | - | - | - | - | - | - | - | - | - | 6 |

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 1 | 2 | 3 | 4 | 5 | 6 | |
|-----------------------------------|---|----|---|---|---|----|---|---|---|---|----|---|----|----|---|---|
| <u>Taraxacum officinale</u> Weber | - | 1a | - | - | - | 2a | - | - | - | - | - | - | - | 1a | - | 4 |
| Compositae <u>indet.</u> | - | - | - | - | - | - | - | - | - | - | 2a | - | 1a | - | - | 3 |

ALISMATACEAE

| | | | | | | | | | | | | | | | | |
|------------------------------------|---|---|---|----|---|----|---|---|---|---|---|---|---|----|---|----|
| <u>Alisma plantago-aquatica</u> L. | - | - | - | 1s | - | 6s | - | - | - | - | - | - | - | 5s | - | 12 |
|------------------------------------|---|---|---|----|---|----|---|---|---|---|---|---|---|----|---|----|

JUNCACEAE

| | | | | | | | | | | | | | | | | |
|-------------------|----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <u>Juncus</u> sp. | 2s | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 2 |
|-------------------|----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

CYPERACEAE

| | | | | | | | | | | | | | | | | |
|--------------------------|---|----|----|---|---|----|---|---|---|---|---|----|---|----|---|---|
| <u>Carex flava</u> agg. | - | - | - | - | - | 1f | - | - | - | - | - | - | - | - | - | 1 |
| <u>C. riparia</u> Curt. | - | 1f | 1f | - | - | - | - | - | - | - | - | - | - | - | - | 2 |
| <u>C. ?pendula</u> Huds. | - | - | - | - | - | - | - | - | - | - | - | 1a | - | - | - | 1 |
| <u>C. ?nigra</u> Reich. | - | - | - | - | - | 1a | - | - | - | - | - | - | - | - | - | 1 |
| <u>Carex</u> spp. | - | - | 1a | - | - | 5a | - | - | - | - | - | - | - | 1p | - | 7 |

GRAMINEAE

| | | | | | | | | | | | | | | | | |
|---------------------|---|----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <u>Triticum</u> sp. | - | 1g | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 |
|---------------------|---|----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

1 2 3 4 5 6 7 8 9 1 2 3 4 5 6

MOLLUSCA

(MARINE)

LAMELLIBRANCHIA

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <u>Mytilus edulis</u> (L.) | - | - | - | - | - | 1 | - | - | - | 1 | 4 | - | - | - | - | 6 |
| <u>Modiolus modiolus</u> (L.) | - | - | - | - | - | 2 | - | - | - | - | 1 | - | - | - | - | 3 |
| <u>Ostrea edulis</u> L. | - | - | - | - | - | 3 | - | - | - | - | - | - | - | - | - | 3 |
| <u>Cerastoderma (=Cardium) edule</u> (L.) | - | - | - | - | - | 3 | - | - | - | - | - | - | - | - | - | 3 |
| <u>Trichotropis borealis</u> | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - | 1 |

(FRESHWATER AND TERRESTRIAL)

GASTROPODA

| | | | | | | | | | | | | | | | | |
|-----------------------------------|---|---|---|---|---|----|----|---|---|---|---|----|----|---|---|-----|
| <u>Theodaxus fluviatilis</u> (L.) | - | 1 | - | - | - | - | - | - | - | - | - | - | 9 | - | - | 10 |
| <u>Bythnia tentaculata</u> (L.) | - | - | 1 | - | - | 32 | 2 | 1 | - | - | - | 5 | 8 | 6 | - | 55 |
| <u>B. leachii</u> (Shep.) | - | - | - | - | - | 12 | - | - | - | - | - | - | 3 | - | - | 15 |
| <u>Viviparus viviparus</u> (L.) | - | - | - | - | - | - | - | - | - | - | - | - | 4 | - | - | 4 |
| <u>Velvata piscinalis</u> (Müll.) | - | 1 | 1 | - | - | 30 | 54 | - | - | 2 | 3 | 7 | 43 | 5 | - | 146 |
| <u>V. cristata</u> Müll. | - | - | - | - | - | 13 | - | - | - | - | - | - | - | - | - | 13 |
| <u>Carychium minutum</u> Müll. | - | - | - | - | - | 3 | - | - | - | - | - | - | - | - | - | 3 |
| <u>Limnea palustris</u> (Müll.) | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 1 |
| <u>L. peregrina</u> (Müll.) | - | - | 2 | 1 | - | 6 | 2 | - | - | - | 1 | 12 | 10 | 4 | - | 38 |
| <u>L. auricularia</u> (L.) | - | - | - | - | - | 22 | - | - | - | - | - | 3 | 3 | 3 | - | 31 |

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 1 | 2 | 3 | 4 | 5 | 6 | |
|---|---|---|---|---|---|----|----|----|----|---|---|---|---|----|---|----|
| <u>Ancylastrum fluviatile</u> (Müll.) | - | - | - | - | - | 5 | - | - | - | - | - | 1 | - | - | - | 6 |
| <u>Ancylus lacustris</u> (L.) | - | - | 1 | - | - | - | - | - | - | - | - | - | - | 8 | 3 | 12 |
| <u>Planorbis planorbis</u> (L.) | - | - | - | - | - | 1 | - | - | - | - | - | - | - | 2 | - | 3 |
| <u>P.vortex</u> (L.) | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - | 1 |
| <u>P.leucostoma</u> Millet. (=spirorbis (L.)) | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - | - | 1 |
| <u>P.albus</u> Müll. | - | - | 1 | - | - | 9 | 1 | - | - | - | - | - | - | - | - | 11 |
| <u>P.contortus</u> (L.) | - | - | - | - | - | 3 | - | - | - | - | - | - | - | - | - | 3 |
| <u>Segmentia complanata</u> (L.) | - | - | - | - | - | 10 | - | - | - | - | - | - | - | - | - | 10 |
| <u>Planorbis</u> spp. | - | 4 | 4 | - | 1 | 14 | - | 7 | 1 | - | - | 5 | 3 | 12 | 1 | 52 |
| <u>Succinea pfeifferi</u> Ross. | - | - | - | - | - | 3 | - | 1 | - | - | - | - | - | 2 | - | 6 |
| <u>S. putris</u> (L.) | - | - | - | - | - | - | 1 | - | - | - | - | - | - | 1 | - | 2 |
| <u>Succinea</u> spp. | - | - | - | - | - | 3 | - | - | - | - | - | - | - | - | - | 3 |
| <u>Pupilla muscorum</u> (L.) | - | - | - | - | - | 2 | 1 | 7 | 2 | - | - | - | - | - | - | 12 |
| <u>Vallonia pulchella</u> (Müll.) | - | - | - | - | - | - | 4 | 8 | 1 | - | - | - | - | - | - | 13 |
| <u>V. excentrica</u> Sterki | - | - | - | - | - | - | - | 4 | - | - | - | - | - | - | 3 | 7 |
| <u>Caeciliodes acicula</u> (Müll.) | - | - | - | - | - | 2 | 15 | 18 | 12 | - | - | - | - | - | 3 | 50 |
| <u>Cochlicopa lubrica</u> (Müll.) | - | - | - | - | - | 1 | 2 | 2 | - | - | - | - | - | - | - | 5 |
| <u>Punctum pygmaeum</u> (Drap.) | - | - | - | - | - | 2 | - | - | - | - | - | - | - | - | - | 2 |
| <u>Discus rotundatus</u> (Müll.) | - | - | - | - | - | 1 | - | 1 | - | - | - | - | - | - | - | 2 |
| <u>Hygromia hispida</u> (L.) | - | - | - | - | - | 1 | - | 5 | 1 | - | - | - | - | - | 6 | 13 |

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 1 | 2 | 3 | 4 | 5 | 6 | |
|-------------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <u>Monacha granulata</u> (Alder) | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | 1 | 2 |
| <u>Helix aspersa</u> Müll. | - | - | - | - | - | 1 | - | 1 | - | - | - | - | - | - | 1 | 3 |
| <u>Zonitoides excavatus</u> (Bean) | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - | 1 |
| <u>Z. nitidus</u> (Müll.) | - | - | - | - | 1 | 1 | - | - | - | - | - | - | - | - | - | 2 |
| <u>Retinella radiatula</u> (Alder) | - | - | - | - | - | - | - | 2 | - | - | - | - | - | - | - | 2 |
| <u>Oxychilus alliarius</u> (Miller) | - | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - | 1 |
| <u>O. cellarius</u> (Müll.) | - | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - | 1 |
| <u>Oxychilus</u> sp. ?spp. | - | - | - | - | - | 1 | - | 1 | - | - | - | - | - | - | - | 2 |
| <u>Vitrea contracta</u> (West) | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - | - | 1 |

BIVALVIA

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|----|---|---|---|---|---|---|---|----|---|----|
| <u>Margaritifera margaritifera</u> (L.) | - | - | - | - | 1 | 2 | - | - | - | - | - | - | - | - | - | 3 |
| <u>Sphaerium corneum</u> (L.) | - | - | - | - | - | 1 | - | - | - | 1 | - | 1 | - | - | - | 3 |
| <u>Pisidium</u> spp. | - | - | 2 | - | 2 | 11 | 6 | 1 | - | 1 | 4 | 9 | 4 | 20 | 2 | 62 |
| <u>Unioniaceae</u> <u>indet.</u> | - | - | - | - | - | - | - | - | - | - | - | - | 4 | 3 | - | 5 |

INSECTA

COLEOPTERA

CARABIDAE

| | | | | | | | | | | | | | | | | |
|------------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <u>Patrobus atrorufus</u> (Strom.) | - | - | 1 | - | - | - | - | - | - | - | - | - | 1 | - | - | 2 |
|------------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 1 | 2 | 3 | 4 | 5 | 6 | |
|--------------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <u>Clivina collaris</u> | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 |
| <u>Bembidion gilvipes</u> (Sturm) | - | 1 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 2 |
| <u>B. harpaloides</u> Ser. | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 |
| <u>B. biguttatum</u> (F.) | 1 | - | 1 | - | - | - | - | - | - | - | - | 1 | - | - | - | 3 |
| <u>B. guttula</u> (F.) | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 |
| <u>Stomis pumicatus</u> (Panz.) | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 |
| <u>Pterostichus diligens</u> (Sturm) | - | 1 | 1 | - | - | - | 1 | - | - | - | - | - | - | - | - | 3 |
| <u>P. madidus</u> (F.) | - | - | - | - | - | 1 | 1 | - | - | - | - | - | - | - | - | 2 |
| <u>P. nigrita</u> (Payk.) | 1 | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - | 2 |
| <u>P. vernalis</u> (Panz.) | - | 1 | - | - | - | 1 | - | - | - | - | - | 1 | - | - | - | 3 |
| <u>P. (Poecilus) sp.</u> | - | - | - | 1 | - | - | - | - | - | - | 1 | 1 | - | - | - | 3 |
| <u>Agonum muelleri</u> (Herbst) | 1 | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 2 |
| <u>Amara familiaris</u> (Dufts.) | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 |
| <u>Badister sodalis</u> (Dufts.) | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | 1 |

HALIPLIDAE

| | | | | | | | | | | | | | | | | |
|----------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <u>Halipplus</u> sp. | - | - | 1 | 1 | - | 1 | - | - | - | - | - | 1 | - | 2 | - | 6 |
|----------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

DYTISCIDAE

| | | | | | | | | | | | | | | | | |
|-----------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <u>Hydroporus</u> sp. | - | 1 | 1 | - | - | - | - | - | - | - | - | - | - | 1 | - | 3 |
|-----------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| | | | | | | | | | | | | | | | | |
|--|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <u>Potamonectes depressus</u> (F.)
<u>ss. elegans</u> (Panz.) | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | 1 |
|--|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| NAME | II | | | | | | | | | IV | | | | | | TOTAL |
|---|----|----|----|---|---|---|---|---|---|----|---|---|---|----|---|-------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 1 | 2 | 3 | 4 | 5 | 6 | |
| HYDROPHILIDAE | | | | | | | | | | | | | | | | |
| <u>Stiletotassus duodecimpunctatus</u> (F.) | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | 1 |
| <u>Agabus bigustulatus</u> (L.) | - | - | 1 | - | - | - | - | - | - | - | - | - | - | 1 | - | 2 |
| <u>Colymbetes fuscus</u> (L.) | - | - | - | 1 | 1 | 1 | - | - | 1 | - | - | - | - | - | - | 4 |
| GYRINIDAE | | | | | | | | | | | | | | | | |
| * <u>Gyrinus colymbus</u> Er. s <u>strigulosus</u> Rég. | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | 1 |
| <u>G. marinus</u> Gyll. | - | - | - | - | - | - | - | - | - | 1 | - | - | - | - | - | 1 |
| <u>Gyrinus</u> sp. | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - | 1 |
| HYDROPHILIDAE | | | | | | | | | | | | | | | | |
| <u>Helophorus grandis</u> Ill. | - | 1 | 1 | - | - | 3 | - | - | - | - | - | 1 | - | 2 | - | 8 |
| <u>H. rubilus</u> F. | - | - | 1 | - | - | - | - | - | - | - | - | 1 | - | - | - | 2 |
| <u>Helophorus</u> spp. | 2 | 11 | 15 | 2 | 1 | 4 | 1 | - | - | - | - | 3 | - | 11 | - | 50 |
| <u>Coelostoma orbiculare</u> (F.) | - | - | - | - | - | - | - | - | - | - | - | 2 | - | - | - | 2 |
| <u>Sphaeridium scarabaeoides</u> (L.) | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - | 1 |
| <u>Cercyon</u> spp. | 6 | 2 | 2 | - | - | 5 | 5 | - | - | - | - | 5 | 1 | 2 | 2 | 30 |
| <u>Chaeterthria seminulum</u> (Herbst) | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | 1 | 2 |
| HYDRAENIDAE | | | | | | | | | | | | | | | | |
| <u>Ochthebius minimus</u> (F.) | 2 | - | - | 2 | - | - | - | - | - | - | - | - | - | 1 | - | 5 |
| <u>Ochthebius</u> spp. | - | 2 | 1 | - | - | - | 1 | - | - | - | - | - | - | - | - | 4 |
| <u>Limnebius</u> sp. | - | 1 | 1 | 1 | - | - | - | - | - | 1 | - | - | - | - | - | 4 |

| NAME | II | | | | | | | | | IV | | | | | | TOTAL |
|--|----|---|---|---|---|---|---|---|---|----|---|---|---|---|---|-------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 1 | 2 | 3 | 4 | 5 | 6 | |
| <u>HYDRAENIDAE</u> | | | | | | | | | | | | | | | | |
| <u>Hydraena testacea</u> | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 1 |
| <u>LEIODIDAE</u> | | | | | | | | | | | | | | | | |
| <u>Choleva</u> or <u>Catops</u> sp. | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - | 1 |
| <u>SILPHIDAE</u> | | | | | | | | | | | | | | | | |
| <u>Silpha atrata</u> L. | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - | 1 |
| <u>STAPHYLINIDAE</u> | | | | | | | | | | | | | | | | |
| <u>Lesteva heeri</u> Fauv. | - | - | 2 | - | - | - | - | - | - | - | - | - | - | - | - | 2 |
| <u>L. longoclytrata</u> (Goeze) | 2 | 4 | 9 | - | - | 1 | - | - | - | - | 1 | 2 | - | 3 | - | 22 |
| <u>Lesteva</u> sp. | - | 1 | - | - | 1 | 2 | - | - | - | - | - | - | - | - | - | 4 |
| <u>Onalium</u> sp. | - | - | - | - | - | 1 | - | - | - | - | 1 | - | - | - | - | 2 |
| <u>Coprophilus striatulus</u> (F.) | 1 | 1 | - | - | - | - | 1 | - | - | - | - | 1 | - | - | - | 4 |
| <u>Carpelinus</u> sp. | - | 3 | 1 | - | - | 1 | - | - | - | - | - | - | - | - | - | 4 |
| <u>Platystethus arenarius</u> (Fourc.) | - | 2 | - | - | - | 1 | - | - | - | - | 1 | 1 | - | - | - | 5 |
| <u>Anotylus complanatus</u> (Fr.) | - | 2 | - | - | - | - | - | - | - | - | - | 1 | - | - | - | 3 |
| <u>A. nitidulus</u> (Grav.) | 2 | 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | 5 |
| <u>A. rugosus</u> (F.) | 2 | 9 | 3 | 1 | 1 | 4 | 3 | - | - | - | 1 | 1 | 1 | 2 | - | 28 |
| <u>A. ?tetracarlinatus</u> | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 |
| <u>Anotylus</u> spp. | - | - | - | 1 | - | 1 | 1 | - | - | - | - | 1 | - | - | - | 4 |
| <u>Stenus</u> spp. | 2 | 3 | 5 | - | 1 | 2 | 1 | - | - | - | - | 2 | - | 1 | 1 | 18 |

| NAME | II | | | | | | | | | IV | | | | | | TOTAL |
|--|----|---|----|---|---|----|---|---|---|----|---|---|---|----|---|-------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 1 | 2 | 3 | 4 | 5 | 6 | |
| STAPHYLINIDAE | | | | | | | | | | | | | | | | |
| <u>Lathrobium</u> spp. | - | 1 | 1 | - | - | - | 2 | - | - | - | - | - | - | - | - | 4 |
| <u>Xantholinus linearis</u> (O1) or <u>longiventris</u>
<u>Heer</u> | - | 5 | 1 | - | - | 2 | 1 | - | - | - | - | - | - | - | - | 9 |
| <u>Xantholinus</u> sp. | - | 1 | - | - | 1 | - | - | - | - | - | 1 | - | 1 | - | 1 | 5 |
| <u>Philonthus</u> spp. | - | 3 | 2 | 1 | - | 1 | 3 | - | - | - | - | - | - | - | - | 10 |
| <u>Staphylinus fortunatorum</u> (Woll.) | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - | 1 |
| <u>Quedius</u> spp. | - | - | - | - | - | 1 | 2 | - | - | - | - | - | 1 | 1 | - | 5 |
| <u>Tachinus</u> sp. | 1 | - | 1 | - | - | - | 1 | - | - | - | 1 | - | - | - | - | 4 |
| Tachyporinae <u>indet.</u> | 1 | 3 | 3 | 3 | - | 4 | 1 | - | - | - | - | - | - | 4 | - | 19 |
| <u>Aleochara</u> sp. | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - | 1 |
| Aleocharinae <u>indet.</u> | 3 | 6 | 12 | 3 | - | 8 | 3 | - | - | - | 2 | - | - | 2 | 2 | 41 |
| TROGIDAE | | | | | | | | | | | | | | | | |
| <u>Trox scaber</u> (L.) | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | 1 |
| GEOTRUPIDAE | | | | | | | | | | | | | | | | |
| <u>Geotrupes</u> sp. | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | 1 |
| SCARABAEIDAE | | | | | | | | | | | | | | | | |
| <u>Aphodius quadrimaculatus</u> (L.) | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - | 1 |
| <u>A. rufipes</u> L. | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - | 1 |
| <u>Aphodius</u> spp. | 2 | 2 | 3 | 1 | 1 | 10 | 8 | 1 | - | - | - | 3 | 2 | 11 | - | 44 |

| NAME | II | | | | | | | | | IV | | | | | | TOTAL |
|---|----|---|---|---|---|---|---|---|---|----|---|---|---|---|---|-------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 1 | 2 | 3 | 4 | 5 | 6 | |
| SCARABAEIDAE | | | | | | | | | | | | | | | | |
| <u>Onthophagus *fracticornis</u> (Preys.)
<u>or similis</u> (Scriba) | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | 1 |
| SCIRTIDAE | | | | | | | | | | | | | | | | |
| <u>Gen. et spp indet.</u> | 2 | 1 | 1 | - | - | 2 | - | - | - | - | - | - | - | 1 | - | 7 |
| BYRRHIDAE | | | | | | | | | | | | | | | | |
| <u>Simplocaria semistriata</u> (F.) | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - | 1 |
| DRYOPIDAE | | | | | | | | | | | | | | | | |
| <u>Dryops</u> sp. | 1 | 1 | - | - | - | - | - | - | - | - | - | 1 | 2 | - | - | 5 |
| ELMIDAE | | | | | | | | | | | | | | | | |
| <u>Oulimnius troglodytes</u> (Gyll.) | - | - | 1 | - | - | 5 | - | - | - | - | - | 2 | 1 | - | - | 9 |
| ELATERIDAE | | | | | | | | | | | | | | | | |
| <u>Agrypnus</u> (=Adalocera) <u>murinus</u> (L.) | - | - | - | - | - | 1 | - | - | - | - | - | - | - | 1 | - | 2 |
| Larvae <u>indet.</u> | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 3 | 3 |
| CANTHARIDAE | | | | | | | | | | | | | | | | |
| <u>Cantharis rustica</u> Fall. | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | 1 |
| <u>Cantharis</u> sp. | - | - | 1 | - | - | - | - | - | - | - | - | - | 1 | - | - | 2 |
| ANUBIIDAE | | | | | | | | | | | | | | | | |
| <u>Grynobius planus</u> (F.) | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - | 1 |
| <u>Xestobium ruforillosum</u> (Deg.) | - | - | - | - | - | - | - | - | - | - | - | 1 | 1 | 1 | - | 3 |

| NAME | II | | | | | | | | | IV | | | | | | TOTAL |
|--|----|---|---|---|---|---|---|---|---|----|---|---|---|---|---|-------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 1 | 2 | 3 | 4 | 5 | 6 | |
| ANOBIIDAE | | | | | | | | | | | | | | | | |
| <u>Anobium punctatum</u> (Deg.) | 9 | 1 | 5 | 1 | - | 2 | - | - | - | - | - | 2 | 1 | - | - | 21 |
| PTINIDAE | | | | | | | | | | | | | | | | |
| <u>Tipnus unicolor</u> (Pill. and Mitt.) | - | 5 | - | - | - | 2 | - | - | - | - | - | 3 | - | - | - | 10 |
| <u>Etinus</u> spp. | - | 1 | 2 | 2 | - | 1 | - | - | - | - | - | - | 1 | - | - | 7 |
| LYCTIDAE | | | | | | | | | | | | | | | | |
| <u>Lyctus linearis</u> (Goeze) | 1 | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | 2 |
| NITIDULIDAE | | | | | | | | | | | | | | | | |
| <u>Meligethes</u> spp. | - | 4 | - | - | - | 2 | - | - | - | - | - | - | - | - | - | 6 |
| SILVANIDAE | | | | | | | | | | | | | | | | |
| <u>Oryzaophilus surinamensis</u> (L.) | 33 | 4 | 1 | 1 | 1 | - | - | - | - | 1 | 4 | - | 1 | - | - | 46 |
| CRYPTOPHAGIDAE | | | | | | | | | | | | | | | | |
| <u>Gen. et spp. indet.</u> | - | - | 1 | - | - | - | - | - | - | - | - | - | 1 | - | - | 2 |
| PHALACRIDAE | | | | | | | | | | | | | | | | |
| <u>Phalacrus gorruscus</u> (Panz.) | - | - | - | - | - | 1 | - | - | - | - | - | 4 | - | - | - | 5 |
| COCCINELLIDAE | | | | | | | | | | | | | | | | |
| <u>Adalia decempunctata</u> (L.) | - | - | - | - | - | 2 | - | - | - | - | - | - | - | - | - | 2 |
| <u>Coccinella septempunctata</u> (L.) | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | 1 |
| ENDOMYCHIDAE | | | | | | | | | | | | | | | | |
| <u>Nycetaea hirta</u> (Marsh.) | 3 | 4 | 3 | - | - | 2 | - | - | - | - | - | - | - | - | - | 12 |

| NAME | II | | | | | | | | | IV | | | | | | TOTAL |
|--|----|----|---|---|---|---|---|---|---|----|---|---|---|---|---|-------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 1 | 2 | 3 | 4 | 5 | 6 | |
| LATERIDIIDAE | | | | | | | | | | | | | | | | |
| <u>Corticorina</u> spp. | - | 3 | 3 | - | - | 6 | - | - | - | - | - | 2 | 1 | 1 | - | 16 |
| COLYDIIDAE | | | | | | | | | | | | | | | | |
| <u>Aglemus brunneus</u> (Gyll.) | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | 1 |
| ANTHICIDAE | | | | | | | | | | | | | | | | |
| <u>Anthicus</u> sp. | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | 1 |
| BRUCHIDAE | | | | | | | | | | | | | | | | |
| <u>Bruchus rufimanus</u> Boh. | 1 | - | - | - | - | - | - | - | - | - | - | 2 | - | - | - | 3 |
| CHRYSOMELIDAE | | | | | | | | | | | | | | | | |
| <u>Donacia</u> sp. | - | - | 1 | - | - | - | - | - | - | - | - | 1 | - | - | - | 2 |
| <u>Chrysolina staphylaea</u> (L.) | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | 1 |
| <u>Gastrophysa viridula</u> (Deg.) | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 |
| <u>Phaedon</u> sp. | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | 1 |
| <u>Hydrothassa glabra</u> (Herbst) | - | 1 | - | - | - | - | - | - | - | - | - | 1 | - | - | - | 2 |
| <u>Prasocuris phellandrii</u> (L.) | - | - | 1 | - | - | 2 | - | - | - | - | - | 1 | - | - | - | 4 |
| <u>Phyllodecta vulgatissima</u> (L.) | - | 1 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 2 |
| <u>Phyllotreta exclamationis</u> (Thun.) | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | 1 |
| <u>P. undulata</u> Kutz. | 2 | - | - | 2 | - | - | - | - | - | - | 1 | - | - | - | - | 5 |
| <u>Phyllotreta</u> spp. | - | 4 | 1 | - | - | - | - | - | - | - | - | 2 | 1 | - | - | 8 |
| <u>Longitarsus</u> spp. | 2 | 12 | 2 | - | 1 | 4 | - | - | - | - | - | 9 | - | 3 | 2 | 35 |

| NAME | II | | | | | | | | | IV | | | | | | TOTAL |
|-------------------------------------|----|----|---|---|---|---|---|---|---|----|---|---|---|---|---|-------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 1 | 2 | 3 | 4 | 5 | 6 | |
| CHRYSEMELIDAE | | | | | | | | | | | | | | | | |
| <u>Chaetocnema concinna</u> (Marsh) | 2 | 1 | 1 | - | - | 3 | - | - | - | - | - | - | - | - | - | 7 |
| <u>Psylliodes cuprea</u> (Koch) | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 |
| APIONIDAE | | | | | | | | | | | | | | | | |
| <u>Apionæneum</u> (F) | - | 3 | - | - | - | - | - | - | - | - | - | 1 | - | - | - | 4 |
| <u>A. cracca</u> (L) | 1 | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 2 |
| <u>Apion</u> spp. | 2 | 2 | 2 | 1 | - | 5 | 2 | - | - | - | - | 4 | - | 2 | - | 20 |
| CURCULIONIDAE | | | | | | | | | | | | | | | | |
| <u>Polydrusus</u> spp. | - | - | - | - | - | - | - | - | - | - | - | 4 | - | - | - | 4 |
| <u>Baronotus</u> sp. | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | 1 |
| <u>Sitona striatellus</u> Gyll. | - | 13 | - | - | - | 4 | - | - | - | - | - | - | - | - | - | 17 |
| <u>Sitona</u> spp. | 1 | - | 2 | 1 | - | - | - | - | - | - | 1 | 3 | 1 | 3 | 1 | 13 |
| <u>Phytonomus punctata</u> (F) | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 |
| <u>Phytonomus</u> spp. | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 |
| <u>Alophus triguttatus</u> (F) | - | - | - | - | - | 1 | - | - | - | - | 1 | - | - | - | - | 2 |
| <u>Sitophilus granarius</u> (L) | 7 | 2 | 3 | - | - | - | - | - | - | 1 | - | 1 | - | - | - | 14 |
| <u>Notaris acridulus</u> (L) | - | 1 | - | 1 | 1 | - | - | - | - | 1 | - | - | 2 | - | - | 6 |
| <u>Geutorhynchus</u> spp. | 4 | 21 | 2 | - | - | 7 | 2 | - | - | - | - | 2 | - | 7 | 1 | 46 |
| SCOLYTIDAE | | | | | | | | | | | | | | | | |
| <u>Lepesinus varius</u> (F) | 1 | - | - | - | - | 1 | - | - | - | - | - | 1 | - | - | - | 3 |

| NAME | II | | | | | | | | | IV | | | | | | TOTAL |
|---------------------------------|----|---|----|----|---|----|---|---|---|----|---|----|---|----|---|-------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 1 | 2 | 3 | 4 | 5 | 6 | |
| HEMIPTERA | | | | | | | | | | | | | | | | |
| <u>Gerris</u> sp. | - | - | - | - | - | 1 | - | - | - | - | - | - | - | 1 | - | 2 |
| <u>Corixidae</u> <u>indet.</u> | 1 | 1 | 5 | - | - | 1 | - | - | - | - | - | 1 | 2 | 1 | - | 12 |
| <u>Gen. et spp. indet.</u> | - | - | 3 | - | - | 2 | - | - | - | - | - | 1 | - | - | - | 6 |
| DERMAPTERA | | | | | | | | | | | | | | | | |
| <u>Forficula auriculata</u> | - | 2 | 1 | - | - | 2 | - | - | - | - | - | 1 | - | 1 | - | 7 |
| HYMENOPTERA | | | | | | | | | | | | | | | | |
| <u>Parasitica</u> <u>indet.</u> | - | 5 | 6 | 2 | - | - | - | - | - | - | - | 3 | 2 | 5 | 1 | 24 |
| <u>Formicidae</u> <u>indet.</u> | - | 5 | 9 | 1 | - | 14 | - | - | - | - | - | 4 | - | 7 | 4 | 44 |
| DIPTERA | | | | | | | | | | | | | | | | |
| <u>Tipulidae</u> <u>indet.</u> | - | - | 4 | 2 | - | 7 | - | - | - | - | 5 | 1 | 1 | 1 | - | 21 |
| <u>Gen. et spp. indet.</u> | 8 | 9 | 13 | 11 | 2 | 10 | 2 | - | 1 | - | - | 14 | 4 | 11 | 4 | 89 |
| ARANAEA | | | | | | | | | | | | | | | | |
| | - | 4 | 2 | - | - | 2 | - | - | - | - | - | 2 | - | - | - | 10 |