The Insect Remains from Burnt Mound II , Willington Quarry Extension, South Derbyshire

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UNIVERSITY OF BIRMINGHAM ENVIRONMENTAL ARCHAEOLOGY SERVICES REPORT 108

INTRODUCTION

A total of 47 bulk samples from the Willington Quarry extension were available for insect analysis. These came from 7 sediment columns or groups of associated samples. Initial assessment of the quality of the material by Mark Robinson, University of Oxford, established that the majority of the samples taken contained insect faunas. However, the concentration of insect remains was often low and the potential for the interpretation of aspects of the wider landscape limited. It was, therefore, recommended that a further full analysis of the insect faunas should be restricted columns 5 and 6 which were directly associated with the Late Neolithic burnt mound. Column 5 is the peaty fill of one of the timber-lined troughs associated with the burnt mound. Column six is a section through the sediments in palaeochannel M that contained burnt stones and was subsequently cut by a timber-lined trough.

METHODS AND ANALYSIS

The insect faunas reported here combine the material examined by Mark Robinson during his assessment and unprocessed sediment samples supplied by ULAS and processed at Birmingham University. The origins of the various faunas are indicated in Table 1. The unprocessed samples were prepared using the standard method of paraffin flotation as outlined in Kenward *et al.* (1980) and sorted and identified under a low power binocular microscope. The weight and volume of each sample are presented at the top of Table 1.

Where achievable the insect remains where identified to species level by direct comparison to specimens in the Gorham and Girling insect collections housed in the Institute for Archaeology and Antiquity, University of Birmingham.

RESULTS

The taxa recovered are presented in Table 1. The nomenclature follows that of Lucht (1987). The majority of the taxa present are beetles (Coleoptera) with a few individuals of caseless caddis flies (Tricoptera).

In order to aid interpretation, where possible, the taxa present have been assigned to ecological groupings following a simplified version of the scheme suggested by Robinson (1981; 1983). The affiliation of each species to a particular ecological grouping is coded in the second column of Table 1. The meaning of each ecological code is explained in the key at the base of Table 1. The occurrence of each of the ecological groupings is expressed as a percentage in Table 2 and in Figure 1. The pasture/ grassland, dung and woodland/ timber species are calculated as percentages of the number of terrestrial species, as opposed to the whole fauna. However, given that the proportion of terrestrial species is often low in these faunas, these figures should not be taken at face value.

The right hand column of Table 1 indicates the plant hosts for those species of beetle that are associated with specific plants. The ecology for this information was mainly derived from Koch (1989; 1992). The plant nomenclature is taken from Stace (1999).

DISCUSSION

Column 5

4 samples of material from the timber-lined trough were analysed during this study. The insect faunas recovered are all very similar in their nature and, as a result, will be discussed together, as though the deposit represented a single unit. The vast majority of the insect faunas recovered are associated with aquatic and waterside environments. Ecological groups ‘a’ (aquatic) and

'ws' (waterside) account for 57–71% of the total fauna recovered (Table 2 and Figure 1). The water beetles consist of a relatively narrow range of species that, today, are usuallyassociated with slow flowing or stagnant waters such as ponds, pools and marshes. For example, the various Hydreanidae recovered, notably *Octhebius minimus* and *O. bicolon*,which are all typical of these water conditions (Hansen 1986). Other taxa associated with this environment are the hydraenid *Hydrochus elongatus* and hydrophilids *Coelostoma orbiculare* and *Cymbiodyta marginella* along with the aquatic Cercyons such as C*. convexiusculus* and *C. sternalis* (Hansen 1986). A slight contrast to this is the presence of a small number of the elmid 'riffle beetles' *Elmis aenea* and *Oulimnius* spp.. Elmids are usually associated with faster flowing water conditions and a sandy or gravely substraight (Holland 1972). However, it is thought that these two taxa are more tolerant of slower flowing and siltier conditions than many in this family and often appear to enter back channels at times of flood (Smith 1999).

Many of these species inhabit waters that are full of a range of waterside and floating vegetation. The presence of a rich stand of such vegetation is also suggested by a number of the phytophage (plant feeding) species recovered. The clearest indicators for this are a range of chrysomelid 'leaf beetles' and curculionid 'weevils'. *Plateumaris braccata* is associated with the common water reed (*Pragmites australis* (Cav.) Trin. ex Steud) and *Donacia bicolor* with bur reeds (*Sparganium* spp.). Similarly the weevil *Notaris acridulus* is associated with reed sweet-grass (*Glyceria maxima* (Hartm.) Holmb). The small orthoperid *Corylophus cassidoides*, which is present in all samples from column 5, is usually found in decaying reed swamp vegetation (Harde 1984).

Given the dominance of both aquatic and waterside species in the samples from the fill of the trough it suggests that the area of the burnt mound became flooded as the result of channel change or rising water table.

One problem when considering this type of insect fauna is that cut off channel and back swamp deposits often appear to 'collect' insects mainly from the local environment (Smith *et al.* 2001; Smith and Howard 2004). This means

that insects from this kind of deposit frequently are not helpful for reconstruction of the surrounding landscape and that pollen often provides the clearest indication. This may also be the case with the material from the Willington burnt mound.

Despite this there is a limited range of insect species that probably do represent conditions on the drier land nearby. There are several indicators for the presence of rough grassland or grazing. This includes *Geotrupes* and *Ahodius* dung beetles, which feed on the droppings of a range of large herbivores. In addition, there is a range of weevils that are associated with rather weedy grassland; such as, *Gastroidea viridula* (associated with dock (*Rumex* spp.)), *Apion aethiops* (associated with vetches (*Vicia* spp.)), *Sitona* species (associated with clover (*Trifolium* spp.)), *Ceutorhynchus rugulosus* (associated with chamomiles and mayweeds (*Anthemus* and *Matricaria* spp.)), *C. asperifoliarum* (associated with borages (Boraginaceae)) and *Mecinus pyraster* and *Gymentron* spp. (which are both associated with plantain (*Plantago lanceolata* L.). However, it is difficult to establish whether the presence of these species indicate larger open clearances maintained for pasture as part of Neolithic / Bronze Age farming practice (i.e. Robinson 2000) or natural clearances maintained by deer, beaver and other 'wild' animals (i.e. Buckland and Edwards; Coles and Orme 1983; Vera 2000). For example, channel change and river undercutting can often result in the development of rough grassland in the floodplain leading to the development of 'wild meadows' (Smith *et al*. 2005). The extent of clearance, and its significance, is probably best investigated through the pollen from this section and it will be interesting to see how this compares to the insect remains.

A similar problem occurs when the small numbers of taxa that are associated with deadwood and trees are considered. Those taxa directly associated with living trees and leaves, such as *Haltica* spp. and *Rhynchaenus* spp., could not be identified to species level. This means that it is not possible to see if their hosts were willow (*Salix* spp.) and alder (*Alnus glutinosa* (L.) from the riverside or came from other tree species within nearby dryland woodland or forest. A similar difficulty is encountered with species associated with dead

trees and associated forest fungi; such as *Melasis buprestoides*, *Asphidiporus orbiculatus*, *Platypus cylindrus* and *Sterocorynes truncorum*. Though clearly associated with deadwood, these taxa are again not host specific. They may represent local riverside trees or have come from forest further away. Also, they may have an origin in the large amount of small wood and timber used in the troughs and wickerwork in the mound itself. Indeed, a similar explanation for the presence of this range of dead wood feeding species at some of the Somerset Levels trackways was advanced by Girling (1980; 1984).

A very small fauna of species that are often associated with human occupation and housing is also present. This consists of of a few *cryptophagids* and *lathridiids*, as well as the 'spider beetle' *Tipnus unicolor* (i.e. Hall and Kenward 1995; Kenward and Hall 1990). However, their presence should not be taken as a direct indicator of human activity, these are species that also occur in dead timber and in dry plant litter in a wide range of natural circumstances. Evidence from many of the other species of beetles associated with human activity is missing.

Column 6

The insect fauna recovered from the column associated with palaeochannel M is essentially similar to that from Column 5. Many of the same species that suggested limited evidence for rough grassland from Column 5 samples are also encountered here. Again it seems clear that the mound is associated with a slow flowing water channel filled with marshy vegetation located within some form of clearing. However, one difference between this fauna and that from Column 5 is the presence of *Dermestes lardarius*, which may be significant. This is a species of 'hide beetle' that is often associated with dried, prepared skins and food waste, though it is often found in birds nests and dead timber,usually at the woodland edge (Peacock 1993). Despite the presence of this insect, no other indicators for food waste or human occupation were present.

CONCLUSIONS

The insect faunas recovered from the troughs and channels at Willington are typical of those recovered from a number of cut off channels of varying dates in the Middle Trent Valley (Greenwood and Smith 2005). Equally, such cut off channels and backswamps seem to be a common component in the Trent throughout this period (Howard and Knight 2004). Unfortunately, the restricted nature of the terrestrial taxa makes any form of wider landscape reconstruction difficult. This means that no meaningful comparison to related insect faunas from the Trent basin, such as those from Bole Ings (Brayshay and Dinnin 1999) or Croft (Smith *et al*. 2005), is possible.

To date, the number of insect faunas examined from burnt mounds in the Trent Valley and nationally is extremely limited. In the Trent basin only those from Girton, Nottinghamshire (Smith 1994) and Castle Donington, Leicestershire (Smith 1997; Smith and Howard 2004) have been examined in any detail. As with the mound at Willington, these seem to have been associated with the banks of cut off channels or backswamps beside or within highly vegetated channels of slow flowing water. There is evidence at both sites for some degree of local woodland clearance.

Like the Willington mound results, these other burnt mound faunas also have produced no indicators for the presence of food waste or human occupation. There are no remains of the 'flesh flies' or 'corpse flies', which one might expect to be associated with food waste and the use of these mounds as cooking / feasting sites (i.e. O'Kelly 1954). There is also a complete lack of human ecto-parasites such as head or body louse (*Pediculus humanus* L.) or human fleas (*Pullex irritans* L.). Both species of parasite are fairly common in settlement sites (i.e. Kenward and Hall 1995) and might be expected to be associated in some numbers with the waste of 'seat lodges' (i.e. Barfield and Hodder 1987). Certainly, regardless of whether these burnt mounds are being used for the cooking of animals or as 'sweat lodges', it seems unlikely that they were being used intensively or continuously for long periods of time.

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Table 1. The insect remains recovered from the Willington Burnt Mound

	Ecology	Column5				Column6					Phytophage host plants
Sample		**256**	**257**	**258**	**259**	**265**	**270**	**283**	**286**	**295**	
Sample origin (A = assessment. S = sediment sample)		S	AS	S	AS	AS	A	AS	S	S	
Processed Weight (Kg)		1	2	3	3	6	1	4	1	3	
Processed Volume (L)		1.5	4	4	4	10	1	6	1	4	
COLEOPTERA											
Carabidae											
Nebria gyllenhali (Schonh.)	**ws**	-	-	-	1	-	-	-	-	-	
Loricera pilicornis (F.)		1	-	-	-	-	-	-	1	-	
Clivnia fossor (L.)		-	1	-	1	-	-	-	-	-	
Clivnia spp.		-	-	1	-	-	-	-	-	-	
Dyschirius globosus Herbst.		-	-	1	1	-	1	-	-	2	
Trechus quadristriatus (Schrk)/ *striatulus* Putzeys.		-	1	-	2	1	-	-	-	-	
Trechus spp.		-	-	-	-	-	-	2	-	-	
Bembidion semipunctatum (Donov.)	ws	-	-	-	-	2	-	-	-	-	
Bembidion assimile Gyll.	ws	-	-	1	-	-	-	-	-	-	
Bembidion doris (Panz.)	**ws**	1	-	1	-	-	-	-	-	-	
Bembidion harpaloides Serv.		-	-	-	-	-	-	-	1	-	
Bembidion unicolor Chaud.		-	1	-	-	-	-	-	-	-	
Bembidion guttula (F.)		-	-	2	2	1	-	-	-	-	
*Bembidion iricolor*Bedel.	c	-	-	1	2	-	-	-	-	-	
Bembidion spp.		1	-	7	4	-	-	3	-	1	
Bradycellus ruficollis (Steph.)	m	-	-	-	1	-	-	-	-	-	
Agonum viduum Panz.	ws	1	-	-	-	-	-	-	-	-	
Agonum thoreyi Dej.	ws	-	1	-	1	1	-	-	-	-	
Agonum spp.	ws	-	1	-	1	-	-	-	-	-	
Poecilus versicolor (Sturm)	ws	1	-	-	-	-	-	-	-	-	
Pterosticus diligens (Sturm.)	ws	-	-	-	-	1	-	-	-	-	
Pterostichus gracilis (Dej.)	ws	-	-	-	-	1	-	-	-	-	
Pterostichus minor Gyll.	ws	1	-	1	1	-	-	-	1	-	
Pterostichus spp.		-	-	-	2	-	-	-	-	-	
Dytiscidae											
Hydroporous spp.	a	1	1	1	1	-	-	-	-	2	
Agabus spp.	a	-	-	1	1	2	-	-	-	-	
Hydraenidae											
Hydraena riparia Kug.	a	-	-	2	1	20	-	-	-	1	
Hydaena testacea Curt.	a	-	-	-	-	-	-	-	1	-	
Hydraena spp.	**a**	2	10	14	23	-	-	-	1	3	
Octhebius bicolon Germ., 1824	a	-	1	-	1	-	-	-	1	1	
Octhebius minimus (F.)	a	3	9	11	3	15	-	3	4	1	
Octhebius spp.	a	13	27	30	33	44	5	3	1	-	
Limnebius spp.	a	1	2	5	13	8	2	1	-	2	
Hydrochus elongatus (Schall.)	a	-	-	1	1	-	-	-	-	-	
Helophorus spp.	a	1	2	4	4	3	1	-	1	6	
Hydrophilidae											

Coelostoma orbiculare F.	a	-	-	-	-	-	-	-	1	-	
Cercyon convexiusculus (Steph.)	a	1	-	-	-	1	-	-	-	-	
Cercyon sternalis Shp.	a	-	1	-	3	-	-	-	-	1	
Cercyon spp.	df	-	-	3	4	1	-	-	-	1	
Megasternum boletophagum (Marsh.)	df	-	-	2	-	-	-	-	-	-	
Hydrobius fuscipes Leach	ws	-	1	-	1	1	-	-	-	-	
Cymbiodyta marginella (F.)	ws	-	-	-	1	-	-	-	-	-	
Silphidae											
Silphidae spp.		-	-	1	-	-	-	-	-	-	
Calmbidae											
Clambus spp.		1	-	-	1	-	-	-	-	1	
Orthoperidae											
Corylophus cassidoides (Marsh.)	*ws*	1	1	3	2	1	1		1	1	
Staphylinidae											
Micropeplus porcatus (Payk.)		1	-	2	-	-	-	-	1	-	
Acidota crenata (F.)		-	-	-	-	-	-	1	-	-	
Lesteva longelytrata (Goeze)	ws	-	-	-	4	2	-	-	-	-	
Lesteva punctata Er.	ws	-	1	2	-	-	1	-	-	2	
Lesteva spp.	ws	-	-	-	-	1	-	-	-	-	
Trogophloeus bilineatus (Steph.)	ws	-	2	2	-	-	-	-	-	-	
Trogophloeus elongatulus Er.	ws	-	-	3	-	-	-	-	-	-	
Trogophloeus spp.	ws	-	-	1	-	-	-	-	-	-	
Oxytelus rugosus (F.)	df	-	-	4	7	3	-	-	-	-	
Oxytelus nitidulus Grav.	df	-	-	3	1	1	-	-	-	-	
Oxytelus spp.	df	1	1	-	2	3	-	-	-	-	
Platystethus nitens (Sahlb.)	ws	-	2	-	-	-	-	-	-	-	
Platystethus spp.	ws	-	-	2	3	-	-	-	-	-	
Bledius spp.	ws	-	-	1	1	1	-	-	-	1	
Stenus spp.		-	1	6	8	5	1	1	2	3	
Stilicus similis Er.		-	-	-	1	-	-	-	-	-	
Lathrobium spp.		-	1	1	3	-	-	-	-	-	
Philonthus spp.		-	1	-	1	1	-	1	-	1	
Othius spp.		-	-	-	-	-	-	-	-	1	
Xantholinus spp.		-	1	4	2	2	-	-	-	-	
Quedius spp.		-	-	-	-	1	-	-	-	-	
Tachyporus spp.		-	-	-	1	-	-	-	-	-	
Tachinus spp.		2	1	-	-	-	-	-	-	-	
Aleocharinae gen. & spp. Indet.		2	7	20	10	10	1	1	1	3	
Pselaphidae											
Bryaxis spp.		3	-	-	2	-	-	1	1	-	
Rybaxis spp.		-	-	-	2	-	-	-	-	-	
Brachygluta spp.		-	-	-	-	1	-	-	-	-	
Reichenbachia spp.		-	-	-	-	1	-	-	-	-	
Malachiidae											
Malachius bipustulatus (L.)	g	-	-	-	-	-	-	-	-	1	

Helodidae											
Helodidae gen & spp. indet	ws	-	-	1	1	-	-	1	-	-	
Helodidae gen & spp. indet ?*Cyphon*	ws	-	-	-	-	1	-	-	-	-	
Eucnemidae											
Melasis buprestoides (L.)	l	-	-	-	1	-	-	-	-	-	Range of hard wood trees
Dryopidae											
Dryops spp.	ws	-	1	6	7	2	1	-	1	3	
Elmis aenea (Mull.)	aff	-	-	1	-	-	-	-	-	-	
Esolus parallelepipedus (Mull.)	aff	-	-	-	-	2	-	-	1	-	
Oulimnius spp.	Aff	-	-	1	2	-	-	-	-	2	
Dermestidae											
Dermestes lardarius L.	df	-	-	-	-	-	1	-	-	-	
Cucujidae											
Monotoma spp.		-	-	-	-	1	-	-	-	-	
Cryptophagidae											
Cryptophagus spp.		1	1	-	-	1	1	-	-	-	
Atomaria spp.		-	1	2	1	1	1	-	-	1	
Phalacridae											
Phalacrus spp.	ws	-	-	-	-	-	-	-	1	-	Range of emergent waterside vegetation
Lathridiidae											
Encimus minutus (L.)		-	-	-	-	1	-	-	-	-	
Encimus spp.		-	1	-	-	-	-	-	-	-	
Corticaria spp.		1	1	-	-	1	-	-	-	-	
Aspidiphoridae											
Aspidiphorus orbiculatus (Gyll.)	l	1	-	-	-	-	-	-	-	-	
Ptinidae											
Tipnus unicolor (Pill.Mitt.)		-	-	1	-	-	-	-	-	-	
Scarabaeidae											
Geotrupes spp.	df	2	-	-	-	-	2	-	-	-	
Aphodus granarius (L.)	df	-	-	1	-	-	-	-	-	-	
Aphodius spp.	df	1	-	2	3	4	-	-	-	2	
Phyllopertha horticola (L.)	g	-	-	-	-	-	-	-	-	1	
Chrysomelidae											
Donacia marginata Hoppe.	ws	-	-	-	-	-	-	-	-	1	*Sparganium* spp. (Burr reeds)
Donacia bicolor Zschach.	ws	-	-	-	1	-	-		-	-	*Sparganium* spp. (Burr reeds)
Donacia cinerea Hbst.	ws	-	-	-	-	-	-	-	-	1	*Typha* spp. (Bull rush)
Donacia spp.	ws	2	-	1	-	-	-	-	-	-	
Plateumaris braccata (Scop.)	ws	-	-	1	-	-	-	-	-	-	*Phragmites australis* (Cav.) Trin. ex Steud.

Plateumaris/Donacia spp.	ws	1	1	-	2	4	1	-	-	1	
Haltica spp.	l	-	-	1	1	1	-	-	-	-	Leaf from a range of trees
Gastroidea viridula(Geer.)	g	-	-	1	1	-	-	-	-	-	Usually on *Rumex* spp. (docks)
Phyllotreta spp.		1	-	-	2	1	-	-	-	-	
Mantura spp.		-	1	-	3	-	-	-	-	-	
Chaetocnema concinna (Marsh.)		-	1	1	-	1	-	-	-	-	
Chaetocnema spp.		-	1	-	1	1	-	-	-	-	
Platypodidae											
Platypus cylindrus (F.)	l	-	-	-	1	-	-	-	-	-	Under bark of a range of hard wood trees
Curculionidae											
Apion hydrolapathi (Marsh.)	g	-	-	-	-	1	-	-	-	-	*Rumex* species (docks)
Apion aethiops Hbst.	g	1	-	-	-	-	-	-	-	-	*Vicia* species (vetch)
Apion spp.	g	1	1	3	2	-	-	1	-	-	
Otiorhynchus spp.		-	-	1	-	-	-	1	-	-	
Polydrusus spp.	g	2	-	-	-	1	-	-	-	-	
Barypeithes araneiformis (Schrk.)		-	-	-	1	-	-	-	-	-	
Barypeithes spp.		1	-	-	-	-	-	-	-	-	
Sitona flavescens (Marsh)	g	-	-	1	2	-	-	-	-	-	*Trifolium* species (clover)
Sitona spp.	g	-	1	3	-	1	-	-	-	2	
Tropiphorus tomentosus (Marsh.)		-	-	-	1	1	-	-	-	-	
Stereocorynes truncorum(Germ.)	l	-	-	-	1	-	-	-	-	-	
Bagous spp.	ws	2	1	3	1	-	-	-	-	-	
Tanysphyrus lemnae (Payk.)	ws	-	-	-	-	1	-	1	-	-	*Lemna* species (duckweed)
Notaris bimaculatus (F.)	ws	-	-	-	-	-	-	-	1	-	Range of waterside vegetation including *Glyceria maxima* (Hartm.) Holmb. and *Typha* spp. (reed sweet-grass and bull rush)
Notaris acridulus (L.)	ws	-	1	1	1	2	-	-	-	1	Mainly on *Glyceria maxima* L.
Notaris spp.	ws	-	2	2	3	2	-	1	-	-	
Thyrogenes nereis (Payk.)	ws	-	-	-	-	-	-	-	-	3	Mainly on *Eleocharis palustris* (L.) Roem. & Schult. (common spike rush)
Thryogenes spp.	ws	-	-	1	-	-	-	-	-	-	
Magdalis spp.		-	-	-	-	-	1	-	-	-	
Limnobaris spp.	ws	-	-	-	-	-	-	-	1	-	Usually on *Carex* spp. (sedge)
Ceutorhynchus rugulosus (Hbst.)	g	-	-	1	-	-	-	-	-	-	*Anthemis* and *Matricaria* species (chamomiles and mayweeds)
Ceutorhynchus asperifoliarum Schltz.	g	-	-	-	1	-	-	-	-	-	wide range of Boraginaceae (Borages)
Ceutorhynchus spp.		-	2	-	-	-	-	1	-	-	
Mecinus pyraster (Hbst.)	g	-	-	-	1	-	-	-	-	-	*Plantago lanceolata* L. (plantain)
Gymnetron spp.	g	-	-	1	1	-	-	-	-	-	*Plantago lanceolata* L. (plantain)
Rhynchaenus spp.	l	-	-	-	-	1	-	-	-	-	Leaves of various trees
Trichoptera		-	1		4	2	2		1	1	
Hymenoptera		-	-	-	-	1	-	-	-	-	

Key to ecological groupings
a - aquatic species

aff - aquatic species normally associated with fast flowing water
ws - waterside species either from muddy banksides or from waterside vegetation
m - species normally associated with moorland
df - species associated with dung and foul matter
g - species associated with grassland and pasture
l - species either associated with trees or with woodland in general

Table 2. Sample statistics and proportions of the ecological groups of insects recovered from the Willington Burnt Mound

	Column 5				Column 6				
	256	**257**	**258**	**259**	**265**	**270**	**283**	**286**	**295**
Total number of individuals	56	95	181	202	167	21	23	24	53
Total number of species	33	40	57	68	51	15	16	20	31
Aquatic (a)	39.3%	55.8%	38.1%	41.6%	55.7%	38.1%	30.4%	41.7%	32.1%
Aquatic fast flowing (aff)	0.0%	0.0%	1.1%	1.0%	1.2%	0.0%	0.0%	4.2%	3.8%
Waterside (ws)	17.9%	15.8%	18.2%	15.8%	13.8%	19.0%	13.0%	25.0%	26.4%
Moorland (m)	0.0%	0.0%	0.0%	1.2%	0.0%	0.0%	0.0%	0.0%	0.0%
Tree (L)	4.2%	0.0%	1.3%	4.8%	4.1%	0.0%	0.0%	0.0%	0.0%
Dung and foul matter (df)	16.7%	3.7%	19.5%	20.2%	24.5%	33.3%	0.0%	0.0%	15.0%
Grassland (g)	16.7%	7.4%	13.0%	9.5%	6.1%	0.0%	7.7%	0.0%	20.0%

Figure 1. Proportions of the ecological groups of insects recovered from the Willington Burnt Mound