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# Plant and invertebrate remains from the Neolithic platform at Parks of Garden, Stirlingshire (site code: AOC 3093)

by Eileen Reilly and Paul Hughes

**Summary**

*Following initial investigations in 1998, eleven samples, collected during excavation of deposits (centred upon the Carse of Stirling) associated with a timber platform at Parks of Garden, Stirlingshire, were submitted for a more detailed analysis of their content of plant and invertebrate macrofossils. Calibrated radiocarbon dates from four samples of birch brushwood (part of the platform structure) suggest that the construction of the platform occurred around 3000 BC.*

*Overall, the beetle assemblages included a limited range of species which were common in most of the contexts. They suggested that there was a gradual change from more eurytropic fen conditions to a woodland margin habitat, where a slightly acidic peat formed. However, as a result of later farming activity and drainage of the bog, development of true poorly humified raised bog peat with its attendant reduction in species richness was not reflected in this profile.*

*Although the presence of the platform indicates that human activity occurred in the area, no strictly 'synanthropic' species were noted. Occupation of the platform, therefore, seems unlikely. The plant remains—lacking in taxa suggesting human food or raw materials—tell a similar story. One possible use of the platform may have been as a 'hide' for hunting on the open mire.*

*Limited information was obtained from the insect and plant macrofossil assemblages with regard to climate and human activity; however, they provide a clear and detailed picture of the local environment throughout the sequence.*

KEYWORDS: PARKS OF GARDEN; STIRLINGSHIRE; SCOTLAND; NEOLITHIC; PEAT; PLANT MACROFOSSILS; CHARRED PLANT MACROFOSSILS; INVERTEBRATES; INSECT REMAINS; BEETLES; LAID TIMBERS; WOODEN PLATFORM

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# Plant and invertebrate remains from the Neolithic platform at Parks of Garden, Stirlingshire (site code: AOC 3093)

## Introduction

AOC Scotland was commissioned by Historic Scotland to excavate fully a dated Neolithic wooden structure at Parks of Garden, Stirlingshire. The site was previously evaluated by AOC in 1998 (Ellis 1999), and four samples were analysed for plant and insect remains as part of this evaluation (Hughes & Kenward 1998), subsequently, a full programme of palaeoenvironmental analysis was instituted in conjunction with the detailed on-site archaeological work.

The site consisted of a series of parallel roundwood timbers and planks, with associated sub-structure, and was interpreted as a platform. Brushwood appears to have been laid at different locations, possibly to provide a cushioned working surface. Calibrated radiocarbon dates from four samples of birch brushwood (part of the platform structure) suggest that the construction of the platform occurred around 3000 BC.

The site was analysed by means of a series of interpretative 'blocks', identified prior to the post-excavation programme. Eleven samples were selected for analysis of plant and insect remains from various contexts throughout these blocks. Five of the samples were taken from the peat profile below the platform (Block 1), four from different areas of the platform surface (Block 2) and two from above the platform (Block 4), after abandonment. Each was carefully chosen to help aid in the reconstruction of the local environment before the platform was built, during its use, and after it was abandoned, possibly indicating reasons why it was abandoned.

## Methods

Following a description (using a *pro forma*), sub-samples of 3 kg from each of the 11 selected samples were disaggregated and sieved to 300μm at the Environmental Archaeology Unit, York, using the paraffin flotation method (Kenward 1980, as modified by Kenward *et al.* 1986).

The laboratory descriptions of the sediments should be viewed with some caution in that both colour and level of humification are likely to have changed in the period since the deposits were excavated. Descriptions following Troels-Smith (1955) and location on the von Post humification scale (von Post, 1924) are also provided but with the same *caveat.*

The plant remains were examined from a series of sieved fractions of the residues and from washovers from processing of additional raw sediment (also to 300μm), again following Kenward *et al.* (*op. cit.*).

Insect remains from the flots were sorted in I.M.S. and placed onto damp filter paper for identification. All beetles were recorded fully quantitatively and a minimum number of individuals (MNI) estimated on the basis of counts of fragments present. All were identified as far as possible using a variety of keys and the Gorham and Girling Collections at the University of Birmingham. Other invertebrate macrofossils were recorded semi-quantitatively but were not identified closely. The decision not to pursue any identifications other than for the beetles was based on the relatively low numbers of all other invertebrate remains (bugs, mites, flies, etc.) in comparison with the beetle

remains and in view of the constraints of time.

## Results

Basic species lists and assemblage statistics were produced for all eleven samples (Appendix 1). For the beetles, habitat or ecological data are given in a key at the bottom of the list (following Robinson 1991). The habitats were grouped into more general ecological ranges, as illustrated in Fig. 1 (Appendix 1). Rank order curves were also produced for groups of samples to determine their species richness and to enable comparisons between samples from different locations (Figs. 3, 4 and 5, Appendix 2; following Kenward 1978). The data from which these graphs are produced are also presented in Appendix 2. In addition, a graph showing the index of diversity—a measure of the species richness of each sample, (Fisher's $\alpha$, Fisher *et al.* 1943)—was produced (Fig. 2, Appendix 2). However, given that all eleven samples came from relatively similar locations, this is perhaps not as useful a tool as it has proved to be elsewhere, particularly in urban contexts (e.g. Kenward & Hall 1995).

The assemblages of plant and insect macrofossils are discussed by block, as excavated, from earliest to latest. Within the blocks, samples are considered in stratigraphic order.

### *Block 1 (Moss development)*

**Context 176, Sample 17601**

Context 176 overlay a clayey silt (Context 177), which in turn overlay the carse clay, off the moraine slope. It is described as a thin band of extremely well humified silty peat.

*Laboratory description*: Dark brown to black, highly humified peat with numerous fine wood fragments. (Troels-Smith description Sh2, Dl1, Dh+, Ag1; von Post humification scale H8/H9).

*Plant macrofossils*: Wood and bark fragments formed the bulk of the moderately well preserved plant remains. Birch (*Betula* sp(p).) was represented by leaf fragments, bud-scales, whole buds and seeds. Other seeds present in the sample included woodrush (*Luzula* sp(p).) and blackberry (*Rubus fruticosus* agg.). Charcoal was frequent in the sample, together with charred *Betula* buds and charred dicotyledon leaf fragments. A number of mire taxa were identified, including cotton grass (*Eriophorum vaginatum*—represented by its sclerenchyma spindles), Ericaceae rootlets, *Sphagnum* Sect. *Acutifolia* leaves, the stems of non-*Sphagnum* mosses, and the leaves of the mosses *Dicranum* sp(p). and *Rhytidiadelphus squarrosus*. Other macrofossils present included rare woody roots, oak (*Quercus*) bud-scales and a single Rosaceae prickle. Small quantities of quartz sand grains were also encountered.

*Insect remains*: Swampy fen and aquatic indicators, particularly *Hydraena riparia* and various species of *Cyphon*, dominated the insect assemblage. These indicate fen-like conditions possibly with large pools of stagnant water but with sufficient nutrient input to enable humification to take place. Decomposing wetland plants such as mosses would have been exploited by the next most frequently occurring taxon, *Lathrobium* spp. The presence of trees, probably on the nearby moraine ridge, is indicated by small numbers of the oak leaf-miner *Rhynchaenus* spp. (possibly *R. avellanae*) and *Rhyncolus ater*. A fallen tree or 'bog oak' was noted during excavation lying within this and subsequent peat deposits and would have provided an ideal habitat for deadwood borers such as *R. ater*. This species has been found in archaeological contexts at the Neolithic Baker and Meare Lake sites, Somerset Levels (Girling 1979; 1980); at the Bronze Age trackway in Thorne Moors, Humberhead Levels (Buckland 1979); at the Neolithic trackway Corlea 10, Co. Longford, Ireland (Reilly 1997); and at various Neolithic and Bronze Age levels throughout Derryville Bog, Co. Tipperary (Reilly 1999). It is a species clearly associated with stands of primary woodland.

Overall, the index of diversity is remarkably low ($\alpha$ = 9), indicating an almost exclusively locally derived and restricted fauna, typical of this kind of environment.

**Context 174, Sample 17401**

Context 174 overlay 176 and is described as very well humified homogeneous peat.

*Laboratory description*: Wet, black, wood peat. (Troels-Smith description Sh3, Dl1, Dh++; von Post humification scale H8/H9).

*Plant macrofossils*: The plant macrofossil remains from this sample were very highly humified. The greater part of sample was composed of woody root fragments, twigs and small pieces of bark. Monocotyledon rootlets were frequent, accompanied by rather poorly preserved dicotyledon leaf fragments and occasional pieces of charcoal (maximum size 6 mm). Other remains present in the sample included a Rosaceae prickle, oak (*Quercus*) bud-scales, several degraded woodrush (*Luzula* sp(p).) seeds and occasional sclerotia of the peat- and soil-dwelling fungus *Cenococcum* sp(p).

*Insect remains*: The assemblage of beetles was very similar in composition to that from Context 176 but with larger numbers. It was again dominated by *Hydraena riparia* and species of *Cyphon* and *Lathrobium*. It also contained large numbers of the pselaphid *Bryaxis* sp., which probably exploited wet mosses and leaf detritus. The presence of a fallen oak would explain the occurrence of a number of wood species, including *Cerylon histeroides* and *Anaspis* sp., which exploit various stages of wood decay. The appearance of the pronouncedly woodland-preferring ground beetle *Leistus rufescens* and of *Rhynchaenus* spp., indicates the continued presence of stands of trees nearby. *Quedius* spp., which are predatory on various invertebrates found in plant detritus and under bark, were also present. The index of diversity was again quite low ($\alpha$ = 10), indicating a limited and predominantly locally derived fauna.

**Context 173, Sample 17301**

This well-humified monocotyledon peat overlay Context 174 and contained bark and other woody inclusions, presumably derived from the fallen oak.

*Laboratory description*: Very dark brown to black, highly humified woody peat. (Troels-Smith description Sh3, Dl+, Dh+; von Post humification scale H9).

*Plant macrofossils*: The bulk of the sample was composed of reasonably well preserved wood and bark fragments (maximum size 105 mm). The remainder of the assemblage was rather limited, including frequent monocotyledon rootlets together with occasional dicotyledon leaf fragments, stems of mosses other than *Sphagnum*, and the leaves and branches of the moss *Thuidium tamariscinum*. Other macrofossils present in the sample included *Polytrichum commune* var. *commune*, leaf tips, woodrush (*Luzula* sp(p).) seeds, birch (*Betula*) and oak (*Quercus*) bud-scales, and rare pieces of charcoal (maximum size 10 mm).

*Insect remains*: The most frequently occurring species were again *Hydraena riparia* and *Cyphon* sp(p)., indicating the dominance of swampy fen conditions. However, the assemblage had a higher index of diversity ($\alpha$ = 19), reflecting the increased diversity of wood feeders and species that exploit woodland detritus. It included the elaterids *Cidnopus minutus* and *Selatosomus bipustulatus* and the weevils *Rhyncolus ater*, *Rhynchaenus* cf. *avellanae* and *R. quercus*. *S. bipustulatus* is not generally found in Scotland and is restricted today to Wales and southern England (Hyman 1992, notable B status); it has been noted in archaeological contexts from Neolithic levels at Runnymede Bridge (Robinson 1991). It is not considered especially climatically sensitive, but its absence from Scotland today and its southerly restriction may indicate that temperatures were slightly higher in the late Neolithic in the study area. However, the presence of one fossil is insufficient evidence upon which to base any definite conclusions. *C. minutus* has also been found archaeologically from Neolithic levels at Runnymede Bridge (Robinson 1991), as well as from mid-Holocene levels at S. Lochboisdale, South Uist, Outer Hebrides (Dinnin 1996), but its current distribution is not well known.

A number of general decomposers, including *Oxytelus fulvipes* and *Dropephylla* sp., which exploit wet woodland environments were also present. It is clear that trees were beginning to grow further down the slope, invading the fen, possibly causing a drying out of the surface.

**Context 137, Sample 13701**

Context 137 was a layer of moderately well-humified peat consisting of twigs, plant fibres and bark. The platform was laid upon the upper surface of this context. Within it, a number of

fallen trees and tree stumps were noted, indicating that a stand of trees had taken root on the peat.

*Laboratory description*: Black, wood-rich, highly humified crumbly peat. (Troels-Smith description Sh2, Dl2, Dh+; von Post humification scale H8).

*Plant macrofossils*: Most of the plant macrofossils from the large residue were moderately well preserved. The most frequent remains were wood, twig and dicotyledon leaf fragments. Some of the leaf fragments were identifiable as birch (*Betula* sp(p).) and the bud-scales, female catkin-scales and fruits of this taxon were all present in the sample. Bryophyte remains were very frequently encountered and included the poorly preserved leaf-bases of *Polytrichum* sp(p)., non-*Sphagnum* moss stems, and spore capsules. Occasional leaf tips of *Polytrichum commune* var. *commune* were also recovered. Other plant remains included occasional monocotyledon rootlet fragments, oak (*Quercus*) bud-scales, and several poorly preserved rush (*Juncus* sp(p).) seeds.

*Insect remains*: The overall number of aquatic species was much reduced, although particular species, such as *Hydroporus* spp., which exploits peaty pools, and *Paracymus scutellaris*, which exploits shallow acid water, were still consistently present. An increasing number of growing trees and their associated leaf detritus evidently eventually led to an increase in acidity of stands of stagnant water in the locality. The presence, in general, of decomposing litter, especially mosses, presumably explains an increase in the numbers of species which exploit this habitat, while the presence of trees and rotting wood would account for the small but consistent numbers of wood feeders. Species such as *Dropephylla ioptera* are found in bracket fungi on wood and under bark, while the ground beetle *Pterostichus oblongopunctatus* is a strong woodland indicator. Other species in this assemblage were *Rhynchaenus pilosus*, a leaf-miner on oak, and *Strophosomus melanogrammus,* noted as a defoliator of various deciduous tree species, including oak, hazel, birch and beech. Similarly, *Phyllobius maculicornis* and *Polydrusus mollis* are both defoliators of oak, birch and hazel. *P. mollis*, also present, is restricted in its distribution today but does occur in southern Scotland (Hyman 1992, notable B status). The index of diversity for this assemblage was higher ($\alpha$ = 16) than for the assemblages from Contexts 176 and 174, though lower than that from 173, mostly because of a reduction in abundance of aquatic species.

**Context 158, Sample 15801**

Further up slope on the moraine, a thin re-worked moraine deposit overlain by a silty peat (Context 158) with occasional inclusions of bark and twigs (Context 151) was observed. This layer underlay part of the platform and, therefore, is discussed in conjunction with Context 137, with which it eventually merges at the beginning of Block 2.

*Laboratory description*: Dark brown (nearly black) wood peat with some larger wood fragments and many finer wood fragments and pebbles. (Troels-Smith description Sh3, Dl1, Dh+, ggmaj++, ggmin++; von Post humification scale H8/H9).

*Plant macrofossils*: Small degraded dicotyledon wood fragments and woody roots formed the greater part of the residue together with bark fragments (maximum size 15 mm) and dicotyledon leaf fragments. In common with many of the other samples birch (*Betula* sp(p).) was represented by a range of remains including leaf fragments, female catkin-scales, bud-scales, a whole bud, and fruits. Several mire taxa were present in the sample, including rare *Polytrichum* sp(p). leaves, and *Sphagnum palustre,* together with non-*Sphagnum* moss stems and rush (*Juncus* sp(p).) seeds. Ten pieces of charcoal were recorded (maximum size 2 mm). The inorganic fraction of the sample included rare quartz sand grains and several rounded pebbles (maximum size 10 mm).

*Insect remains*: Like Context 137, Context 158 saw a reduction in the numbers of aquatic species; however, unlike 137, species such as *Hydraena riparia* and *Cyphon* were abundant (Appendix 2). The presence of a stand of reeds is indicated by a moderate number of *Plateumaris sericea*, and, overall, the number of decomposers indicates active humification. Apart from one example of *Geotrupes* sp., there were no clear indicators of dung. Some *Geotrupes* can exploit very small patches of droppings, and are not dependent on large herbivores. The index of diversity was lower ($\alpha$ = 14) than for the assemblage from Context 173 but higher than for 174 and 176, indicating an increase in the variety of habitats available but a decrease in the variety of aquatics.

The presence of oak and primary woodland was a consistent picture in Block 1, and Context 158 was no exception, showing an overall increase in the numbers of woodland species and exploiters of dead wood. These species included the leaf-miners *Strophosomus melanogrammus*, *Phyllobius*

*maculicornis* and *Polydrusus mollis* and the dead wood feeder *Rhyncolus ater*.

**Summary of Block 1**

*Plant remains*: The peat layers from Contexts 158, 137, 173, 174 and 176 provided evidence for contrasting peatland environments. The assemblages from Contexts 137 and 173 were rich in monocotyledon remains, brown mosses and wood fragments, suggesting the presence of a fen-carr woodland. The moderate to good preservation of these fen deposits and the lack of sclerotia from soil fungi suggest that the surface of the mire remained waterlogged throughout the development of the deposit. The mire communities contained both *Polytrichum commune* var. *commune* and rushes (*Juncus* sp(p).) which suggest that the fen-carr developed on relatively thin peats.

The evidence from Context 174 is rather more difficult to evaluate because of the advanced state of decomposition of plant remains. Only the more robust macrofossil remains survived in the deposit but there is clear evidence that birch and oak trees were present nearby. Sizeable charcoal fragments in the sample demonstrate local burning of the mire surface and soil fungus sclerotia indicate that the peat surface became aerated either at the time of deposition or sometime thereafter.

The botanical evidence from Context 176 suggests the existence of a rather more acidic mire supporting cotton-grass and *Sphagnum* section *Acutifolia*. The mire surface probably remained waterlogged throughout this phase, as indicated by the lack of soil fungus sclerotia. Bud-scales of oak found in this sample may have originated from trees overhanging the site or growing on dry ground nearby.

*Insect remains*: The assemblages from Contexts 176, 174 and 173 clearly show the development of the peat basin, from earliest levels where open pools of stagnant water and associated swampy wetland plants were present. A gradual reduction of open water species and the development of monocotyledonous peats was seen through Contexts 173 and 137. The rank order curves for these three contexts show remarkably similar profiles (Fig. 3), produced by the dominance of one or two species in each assemblage. The presence of a stand of oak forest is clearly indicated throughout this phase, reaching its peak in Contexts 173 and 137. However, the uptake of available moisture through root systems may have led to a slight drying of the peat surface and therefore conditions more favourable to tree growth. The addition of woodland-derived plant detritus increased the variety of decomposer and dead wood feeders and reduced the dominance of one or two species. The rank order curves reflect this trend, with Context 137 showing an increased flattening of the curve. Context 158, although slightly different in composition, also shows this flattening. The slightly drier peat surface, however, must be seen in context, as it would merely mean that larger open bodies of water were reduced in size and gradually infilled by decomposing plant matter and mats of floating mosses. The fact that the surface was still mostly unstable is demonstrated by the fact that the platform suffered subsidence in a number of locations and brushwood was laid below the superstructure to compensate for very wet patches of ground (Ellis, unpublished stratigraphic report).

## *Block 2 (The Platform)*

**Context 156, Sample 15601**

This layer consisted of a mixture of bark and peat overlaying an area of burnt timbers in the structure (Context 135). It is thought that this might have been deliberately spread after the burning event.

*Laboratory description*: Dark brown, highly humified crumbly peat with numerous fine wood fragments. (Troels-Smith description Sh2, Dl2, Dh+; von Post humification scale H8).

*Plant macrofossils*: A very limited plant macrofossil assemblage was identified from this rather poorly preserved deposit. The bulk of the sample contained finely fragmented dicotyledon wood and bark fragments (maximum size 12 mm) together with woody roots. Other plant remains included occasional pieces of charcoal (maximum size 7 mm), charred monocotyledon rootlets (maximum size 6 mm), sclerotia of *Cenococcum* sp(p). (maximum diameter 6 mm) and the seeds of woodrush (*Luzula* sp(p).). The residue also contained a small inorganic fraction composed of several pebbles (maximum dimension 9 mm) and rare quartz sand grains.

*Insect remains*: The assemblage of beetles was too small, in comparison with those from other samples, to draw any conclusions. Woodland indicators and decomposers dominated the

assemblage, which was unsurprising given the composition of the peat. The peat was probably redeposited and effectively its fauna represents a sub-set of commonly occurring species elsewhere on the site. The burning would have created an artificially dry habitat and restricted the normal decomposition processes. The sample was not deemed worthy of further analysis.

**Context 109, Sample 10901**

Context 109, along with 115 and 131, were woody peat layers which overlay the platform, probably representing activity phases. In particular, Context 109 was described as a well-humified fibrous peat, containing bark, twigs and brushwood occurring around and between a series of closely-packed round timbers, which made up the superstructure of the platform.

*Laboratory description*: Moist, brown to black, humified woody peat. (Troels-Smith description Sh2, Dl2, Dh+; von Post humification scale H8).

*Plant macrofossils*: Dicotyledon wood fragments and bark formed the bulk of the sample, accompanied by leaf fragments, fruits and bud-scales of birch (*Betula* sp(p).). A range of remains from mire species were also present, including sedge (*Carex* sp(p).) nutlets, *Sphagnum* sp(p). stems, the leaves of *Sphagnum palustre,* and the leaf-bases of *Polytrichum* sp(p). In addition, the sample contained occasional well preserved monocotyledon rootlets, which may be modern.

*Insect remains*: A large assemblage was recovered. The dominant species were decomposers and fen/carr woodland indicators such as *Lathrobium* spp., *Olophrum piceum* and the ground beetle *Pterostichus diligens*. The presence of water and a stand of sedge either nearby, spread on the platform surface or, less probably, growing through the platform, was indicated by a moderate number of *Plateumaris sericea*. This species commonly occurs in similar archaeological contexts such as Meare Lake, Baker site and Rowland trackway and Sweet Track, Somerset Levels (Girling 1979; 1980; 1984) and Thorne Moors, Humberhead Levels (Buckland 1979). Small but consistent numbers of other acid water indicators were present but could easily be accounted for by small peaty or mossy pools forming between timbers.

A large variety of woodland species, dead wood feeders and decomposers common in woodland environments were present, giving an index of diversity higher than that for the assemblage from any earlier context ($\alpha = 21$) but still low enough to indicate a mostly locally derived fauna. *Melanotus erythropus* is found in wet rotting wood and *Aspidiphorus orbiculatus* feeds on tree fungi. Most of these species are common on dead wood; however, a number of defoliators were also present, indicating nearby standing. There were no synanthropic species to indicate human activity and only one dung indicator, *Geotrupes* sp., was present. The dung could be derived from wild animals, however, and is not an indication of domesticated animals. There were other indicators of foul, rotting material, even dung, but these could also have been exploiting rotting plant matter.

**Context 115, Sample 11501**

Context 115 incorporated large amounts of brushwood, twigs and bark. It was similar in composition to Context 109 and may have represented part of the same event.

*Laboratory description*: Moist, dark brown to black, woody peat with some moderately fresh monocotyledon rootlets. (Troels-Smith description Sh2, Dl2, Dh++; von Post humification scale H8).

*Plant macrofossils*: The residue from this sample contained a much greater proportion of mire taxa than previous samples, including frequent remains of cotton-grass (*Eriophorum vaginatum,* —sclerenchya spindles, leaf fragments, roots and rhizomes), *Sphagnum* stems, leaves of *Sphagnum palustre*, the seeds of cross-leafed heath (*Erica tetralix*), *Polytrichum* sp(p). leaf-bases, sedge (*Carex* sp(p).) nutlets and hypnoid moss fragments. In common with other samples, the remains of birch (*Betula* sp(p).) were frequent and included bud-scales, leaf fragments, whole buds and fruits. Unidentifiable wood and bark fragments were frequent. Other plant macrofossil remains included sclerotia of *Cenococcum* and dicotyledon leaf fragments. The sample was strongly humified and many of the macrofossils were broken and degraded. Remains of *Eriophorum vaginatum* are usually very resistant to decay but in the present deposit the fragments of this species were in an advanced state of decomposition.

*Insect remains*: Although the assemblage was smaller than that from Context 109, it was similarly dominated by the sedge beetle *Platumaris sericea* and the acid water indicator *Paracymus scutellaris*; it appears to have formed

under wetter conditions than Context 109. It would appear from Contexts 109 and 115 that this part of the platform overlay a wet area with sedge, which might explain why brushwood was laid on the surface at this point. Rather than providing a cushioned working surface, the brushwood was perhaps simply intended to compensate for increased wetness. This is more clearly demonstrated in Context 115 than 109: aquatic species make up 22% of the assemblage from the former, compared with 11% for that from the latter.

The index of diversity, though lower than Context 109, reflects the actively decomposing and sodden surface of the platform and a clearly locally derived fauna. A smaller number of tree-associated species was present, but these still clearly indicated the presence of oak and birch.

**Context 131, Sample 13101**

Context 131 abutted oak laths (Context 102), which lay east–west across the superstructure, upslope from Contexts 115 and 109. This was an extremely well humified peat, with apparently highly degraded charcoal, bark fragments, random twigs and some larger branches. It may represent the working level of the west side of the structure. The context itself sloped to the east and north.

*Laboratory description*: Moist, black, highly humified woody peat. (Troels-Smith description Sh3, Dl1, Dh++; von Post humification scale H8/H9).

*Plant macrofossils*: The preservation of the plant remains from this sample was rather poor. The bulk of the sample was composed of small wood fragments (maximum size 7 mm), bark fragments and the sclerotia of *Cenococcum*. The large number of slerotia suggest that the deposit represented by the sample was aerated either at the time of deposition or at some point after deposition. Other constituents of the sample included occasional monocotyledon rootlets, poorly preserved dicotyledon leaf fragments, woodrush (*Luzula* sp(p).), rush (*Juncus* sp(p).) seeds (the outer coat was missing from the latter) and quartz sand grains. Limited numbers of burnt plant remains were encountered including charcoal (proper) and partly-charred moss stems, and birch (*Betula*) bud-scales and buds. Several uncharred leaves of the moss *Thuidium tamariscinum* were also identified.

*Insect remains*: A very large assemblage was recovered, similar in numbers to those from the fen peat contexts 174 and 173. The index of diversity was not high ($\alpha$ = 16), however, as the assemblage was dominated by one or two fen and decomposing vegetation species and some acid water indicators. The presence of leaf detritus and other woodland-derived plant matter was indicated by *Cercyon sternalis* and woodland pools by *Agabus bipustulatus/striolatus*. Although mostly in small numbers, there was quite a variety of woodland indicators, from both standing trees and dead wood, including the now rare *Cerylon fagi*, which occurs in oak and beech and is restricted to parts of southern Scotland and parts of England and Wales (Hyman 1992). Two scolytids, *Dryocoetinus villosus* and *Trypodendron* sp., indicated recently dead or fallen trees; *D. villosus* in particular occurs on trees with thick bark and is common in Scottish oak woodland (Alexander 1994). *Rhynchaenus quercus* was also present and, along with the above and some other species, suggests that oak was the dominant tree species, both growing naturally and used in the construction of the platform.

Again, there are no clear indicators of human activity, apart from the temporary artificial habitats created by the construction of the platform; most of the species in Context 131 would have occurred in the natural surrounding environment, albeit in smaller numbers. There are no species to indicate what the platform was used for and few indicators of dung.

**Summary of Block 2**

*Plant remains*: The plant remains from the contexts representing the platform displayed rather variable levels of preservation. Context 156 produced a very limited assemblage which provided evidence for local burning. Many of the plant remains were either partly or completely charred. Context 131 provided further evidence for local burning of the platform. The plant assemblage included a range of charred remains including charcoal and partly charred moss stems. This deposit was clearly well aerated at some time, as shown by the poor plant preservation and the abundance of fungal sclerotia.

Evidence from Contexts 109 and 115 suggested that the platform at both locations was sited in a poor fen environment which included the cross-leaved heath, and the bog moss *Sphagnum palustre* (which is commonly found in mire

sequences at the transition between fen and true raised-bog). Sedges were clearly growing at or near the sampling sites, as shown by the presence of nutlets of at least two species. The remains of birch in these samples probably represent brushwood used to construct the platform.

*Insect remains*: The four samples from Block 2 came from slightly different locations across the surface of the platform. Unfortunately, Sample 15601 (Context 156) did not yield sufficient material to provide valid comparisons with the other three.

The rank order curves for the three contexts with large enough assemblages reflect slightly different conditions in each location (Fig. 4). Contexts 109 and 115 were similar wood-rich peats from the brushwood area of the platform. Swampy fen indicators such as *Plateumaris sericea* dominated both. The presence of brushwood was thought, in the field, to reflect deliberate spreading of material to provide a working surface. However, given the dominance of wetland indicators over woodland indicators, it seems more likely that this portion of the platform was subject to increased wetness, possibly because of subsidence, in particular in the area of Context 115 (Fig. 1). The brushwood was, therefore, probably spread to provide a drier walking surface. Excluding these taxa, the vast majority of both assemblages reflect a highly organic decomposing mass of leaf litter, woody detritus and other plant matter. There are no clear indications of human activity from the assemblage, and even species which today are regarded as elements of the 'urban fauna' (Kenward and Allison 1994) are here simply reflecting their natural habitat. The Neolithic Baker platform, in the Somerset Levels (Girling 1980), for example, produced a moderate-sized component of dung beetles, indicating possible use of the platform by domestic animals. No such component is seen here.

Although the assemblage from Context 131 was larger than those from Contexts 109 and 115 as a result of the presence of substantial numbers of two taxa, it generally mirrored the findings from those deposits. The proportion of aquatics was lower but the overall picture was of decomposing plant litter from a swampy fen environment. Again, the presence of brushwood, the platform wood and local standing trees provided ample habitats for a wide variety of woodland and woodland detritus indicators. Species such as the tentatively identified *Crataraea suturalis* and *Megasternum obscurum* occurred in moderate numbers and, although both are later strongly associated with humans and are often part of the 'urban fauna' group, here they were probably exploiting relatively 'natural' habitats provided by a build-up of decaying organic matter on the platform surface.

## *Block 4 (after abandonment)*

### Context 104, Sample 10401

Capping Context 115 over much of the site was Context 104, a well-humified peat with layers of bark.

*Laboratory description*: Dark brown, crumbly, humified wood peat. (Troels-Smith description Sh2, Dl2, Dh+; von Post humification scale H7/H8).

*Plant macrofossils*: The preservation of plant remains from this sample was rather poor; degraded wood fragments (maximum size 10 mm), bark fragments (maximum size 5 mm), and unidentifiable organic matter formed the bulk of the sample. Birch (*Betula* sp(p).) remains were frequent and included bud-scales, leaf fragments, female catkin-scales and rare fruits. Mire plants were represented in the sample by bog moss (*Sphagnum* sp(p).) stems, poorly preserved *Polytrichum* sp(p). leaf-bases, cotton-grass (*Eriophorum vaginatum* L.) sclerenchyma spindles and rarely also the leaf veins of *E. vaginatum*. The resting bodies (sclerotia) of the soil fungus *Cenococcum* were also present in small numbers.

*Insect remains*: Swampy and decomposing vegetation species, as well as acid water and pool indicators dominated the assemblage. The presence of a bed of sedges and reeds was indicated by *Plateumaris sericea*, while aquatic indicators included *Paracymus scutellaris* and *Hydroporus melanarius*. The index of diversity ($\alpha$ = 16) was similar to that for the assemblage from Context 131, albeit with much smaller numbers of individuals, and the number of woodland indicators was also lower. The anobiid *Grynobius planus*, which is found in drier wood, was present. Clearly, there was active decomposition taking place, though perhaps less of the detritus derived from woodland. This may indicate that the area was slightly wetter as a result of reduced tree growth; however, it was not as restricting (i.e. the index of diversity was still relatively high) or as clearly defined as for Contexts 176 or 174.

**Context 127, Sample 12701**

Context 127 consisted of a well-humified peat with bark, twigs and charcoal inclusions. It partly overlay 131, and the area in which it occurred was subject to a great deal of post-depositional disturbance by moles and other animals.

*Laboratory description*: Dark brown, crumbly, highly humified woody peat. (Troels-Smith description Sh2, Dl2, Dh+; von Post humification scale H7/H8).

*Plant macrofossils*: The residue from this sample was very highly humified and principally contained small dicotyledon wood fragments (maximum size 12 mm) and bark fragments (maximum size 10 mm). A rather limited assemblage of plant remains was recovered including frequent monocotyledon rootlets and sclerotia of *Cenococcum*. Some of the monocotyledon rootlets were well preserved and may be modern, having penetrated into the deposit from above. Birch (*Betula*) bud-scales and wood rush (*Luzula* sp(p).) seeds were occasionally recovered. Charcoal fragments (maximum size 5 mm), quartz sand grains and non-*Sphagnum* moss stems were all rare.

*Insect remains*: The post-depositional disturbance possibly resulted in aeration of the layer and subsequent decomposition, as the assemblage was much smaller than those from other samples (except 156). It was, however, dominated by swampy fen indicators, aquatics and decomposing plant litter species similar to those occurring elsewhere on the site. This at least points to the fact that no post-depositional elements were incorporated into the assemblage and that the lower numbers were perhaps a factor of decay. It was noted during sorting that the fragments did appear to be subject to some form of chemical decay. The index of diversity was quite high in comparison with other contexts ($\alpha = 21$) and the same as for Context 109, but this may be because of differential degradation of particular species and may not be a true reflection of the nature of the fauna at the time the deposit formed.

The assemblage was dominated, like that from Context 104, by the acid pool indicators *Hydroporus melanarius* and *Paracymus scutellaris*, and by *Lathrobium* spp., several of which are typical of acid swamps. The number of woodland indicators was small (as with Context 104), and, overall, the fauna would appear to indicate an increase in wetness. However, it is difficult to make any firm conclusion.

**Summary of Block 4**

*Plant remains*: Context 127 contained a rather limited assemblage of plant remains including brushwood, charcoal and *Cenococcum* sclerotia. In many respects it was similar to Context 131. Context 104 contained a greater proportion of wetland species than many of the previous contexts. Whilst brushwood still formed a large part of the sample there was evidence that a stand of cotton-grass grew at the sampling point, accompanied by *Polytrichum* and bog mosses. Sclenchyma spindles of cotton-grass were frequently encountered in the sample and fibres of this plant were also noted. These two elements of cotton-grass are the most resistant to decay and are often the last identifiable macrofossils in highly humified sedge peats.

*Insect remains*: The two layers representing peat build-up after the abandonment of the site gave very similar rank order curves (Fig. 5). There was a strong similarity between these profiles and those from Contexts 115 and 109, reflecting a slow growth of peat in relatively dry conditions, despite the fact that the assemblages from both contexts showed dominance by swampy-marsh indicators and pool aquatic species. However, some woodland indicators were still present, indicating some input from that source. There was a reduction in concentration of remains in Context 127, which most likely reflects post-depositional decomposition caused by burrowing animals and later eighteenth- and nineteenth-century drainage and farming practices.

## Discussion and conclusions

Despite the difference in profiles of the rank order curves of each context and the slight increase in the index of diversity through the profile, overall, the beetle assemblages included a limited range of species which were common in most of the contexts. The clearest differences occurred earlier on, with the gradual change from more eurytropic fen conditions to slightly acidic woodland margin peat. However, a true poorly humified raised-bog peat with its attendant reduction in species richness was not reflected in this profile, presumably as a result of later farming activity and drainage of the bog. Although

no strictly 'synanthropic' species indicating human activity were noted, it can be said that the presence of the platform certainly increased the variety and possibly the population density of various species, particularly some decomposers. However, all would be found exploiting similar niches in nearby forest floors.

Insect assemblages from other platform sites such as the Neolithic Baker platform in the Somerset Levels and the Bronze Age platform at Flag Fen, in Eastern England, clearly showed some human influence, mostly *via* domesticated animals, in the form of large numbers of dung beetles (Robinson 1992). However, Robinson concluded that the platform at Flag Fen could not have been occupied, even temporarily, by buildings, in view of the lack of large numbers of the woodworm beetle *Anobium punctatum*, beetles of the family Lathridiidae, and other synanthropic insects seen at the Iron Age Meare Lake Village site in the Somerset Levels (Girling 1979). At that latter site, the assemblage very much reflected the group of insects commonly known as 'urban fauna' (Kenward and Alison 1994). Indeed, in the case of the Flag Fen platform, the only hint of human activity was the dung beetles. Clearly the platform at Parks of Garden does not display any of these key synanthropic elements. Therefore, occupation of the platform, which seemed unlikely given the lack of finds during excavations, seems even more unlikely on the basis of the insect assemblages recovered. The plant remains—lacking in taxa suggesting human food or raw materials—tell a similar story.

A feature common to all three sites (Flag Fen, Meare Lake, and Parks of Garden) was the large number of aquatic and marsh indicators recovered from the platform surfaces, as seen in Contexts 115, 109 and 131. Similar results were also noted from the platforms Derryfadda 6 and 9 in Derryville Bog, Ireland (Reilly 1999). Both Robinson (1992) and Girling (1979) concluded that pools of water were collecting on the platform surface, and it would seem that this was also the case with the platform at Parks of Garden. This build-up of water may have been more pronounced in the area of Context 115 and 109, and the addition of brushwood, twigs and mosses to the surface may have been made partly to compensate for this wetness and provide a drier working or walking surface.

There are few, if any, indicators of a climate different from that of the present day through the peat profile. Only one beetle recovered is restricted in its range today—the elaterid *Selatosomus bipustulatus*. It is no longer recorded in Scotland and is very much restricted to (and possibly declining in) areas of south, south-east and south-west England and Wales (Hyman 1992). Other wood borers, such as *Polydrusus mollis* and *Cerylon fagi,* are found in southern Scotland but are restricted in their occurrence. The water beetle *Anacaena bipustulata* also has a more southerly restriction today and is found only in England and Wales (Hyman 1992). In contrast, however, *Rhyncolus ater* has a more northerly range and is commonly found in Scotland today but rarer in southern England. The restriction of wood-dependant species may be related more to forest clearance and forest management than subtle changes in climatic conditions. Most of these species are borers of deadwood and 'tidier' forest practices have led to many species becoming highly restricted in their distribution and even extinct. This phenomenon has been demonstrated at Thorne Moors (Buckland 1979), the Somerset Levels (Girling 1984), and by recent findings from Derryville Bog in Ireland (Reilly 1999).

Limited information was derived from the insect assemblages in terms of climate and human activity (although the lack of evidence for the latter is significant), but they provided a useful definition of the local environment and reaffirmed the initial findings of the archaeological excavation. Comparisons with similar sites in Scotland would be very productive in the future, as insect assemblages from other sites have demonstrated differences in the function and uses of platforms.

One possible use of the platform may have been as a hide for hunting on the open mire. Similar structures have been built on mires in several parts of Britain including Glasson Moss, Cumbria and Tregaron Bog (Cors Caron), Wales. At Tregaron, remains of small platforms used for hunting date from the nineteenth and early twentieth centuries and are now visible as patches of disturbed vegetation. *Molinia caerulea* (purple moor grass) is a common invader onto the mire surface where the platforms once stood (personal communication site warden at Cors Caron NNR). There is no evidence for *Molinia caerulea* in the Parks of Garden samples but the remains of this plant may have disappeared from the record since it is less resistant to decay than other mire species such as cotton-grass. A similar theory was offered for the use of platform Derryfadda 9, Derryville Bog, where a wooden shaft, thought to be part of a hunting implement, was found (Cross *et al.* 1999). As with the insect assemblage from Parks of Garden, the remains from the surface of the trackway at Derryville Bog, did not indicate any human activity.

## Retention and disposal

All remaining sediment from these deposits should be retained and stored in conditions designed to minimise any further deterioration of the plant and invertebrate remains contained within them.

## Archive

All material is currently stored in the Environmental Archaeology Unit, University of York, along with paper and electronic records pertaining to the work described here.

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# Appendix 1

*Species lists and basic habitat statistics*

*Table 1. Plant taxa from Parks of Garden, Stirlingshire.*

| **Taxon** | **Common name** |
|---|---|
| *Betula* sp(p). | birch |
| *Quercus* sp(p). | oak |
| Rosaceae | rose family |
| *Rubus fruticosus* agg. | blackberry/bramble |
| *Erica tetralix* L. | cross-leaved heath |
| *Juncus* sp(p). | rushes |
| *Luzula* sp(p). | woodrushes |
| *Eriophorum vaginatum* L. | cotton-grass |
| *Carex* sp(p). | sedges |
| *Sphagnum palustre* | |
| *Sphagnum* Section *Acutifolia* | |
| *Polytrichum* sp(p). | |
| *Polytrichum commune* var. *commune* Hedw. | |
| *Dicranum* sp(p). | |
| *Thuidium tamariscinum* (Hedw.) Br. Eur. | |
| *Rhytidiadelphus squarrosus* (Hedw.) Warnst. | |

*Table 2. Insect taxa from Parks of Garden, Stirlingshire. List follows Kloet and Hincks 1964-77. Key (after Robinson 1991): A- aquatic; B – bankside; C – carrion; D – disturbed ground; F – foul (dung); G – grassland; M – marsh (fen/bog); T – terrestrial; V – decaying plant matter; W – woodland.*

| **Sample Number** | **17601** | **17401** | **17301** | **15801** | **13701** | **15601** | **10901** | **11501** | **13101** | **10401** | **12701** | **Habitat** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Context Number** | **176** | **174** | **173** | **158** | **137** | **156** | **109** | **115** | **131** | **104** | **127** | |
| | | | | | | | | | | | | |
| **Taxon** | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| **Carabidae** | | | | | | | | | | | | |
| *Leistus rufescens* (Fab.) | | 1 | | | | | | | | | | MW |
| *Notiophilus biguttatus* (Fab.) | | | | 1 | | | | 1 | | | | W |
| *Trechus quadristriatus* (Schrank) | | | | 8 | | | | | 1 | | | BT - also leaf litter |
| *Trechus* sp. | | 1 | | | | | 1 | 1 | | 1 | | BMW |
| *Bembidion* sp. | 1 | 5 | 1 | | | | | | 3 | 1 | | DGT |
| *Pterostichus diligens* (Sturm) | | | 5 | 3 | 6 | | 10 | 3 | 7 | 4 | | MG - often wet |
| *P. minor* (Gyll.) | | | 1 | 1 | 4 | | 1 | | | 1 | | MB - both open and wooded |
| *P. niger* (Schaller) | | | | | | | 1 | | | 1 | | W (GD) |
| *P. nigrita* (Payk.) | 1 | | | 1 | | | | 3 | 1 | 1 | | MB |
| *P. oblongopunctatus* (Fab.) | | | | | 3 | | | | | | | W - damp, under bark |
| *P. strenuus* (Panz.) | | 2 | | 1 | | | 6 | 3 | | 2 | | T - often near water |
| *Pterostichus* sp. | 1 | 1 | | | | | 3 | | | | 1 | various |
| *Agonum fuliginosum* (Panz.) | 1 | | 3 | 4 | 4 | | 4 | 3 | 2 | 7 | 2 | W - wet, M - shaded |
| *Agonum* spp. | | | 4 | | | | 1 | | 3 | | | various |
| | | | | | | | | | | | | |
| **Dysticidae** | | | | | | | | | | | | |
| *Hydroporus angustatus* Sturm | | | | | 3 | | | 2 | | | | A - fens, ponds |
| *H.* cf. *longicornis* Sharp | | | | | 1 | | | | 3 | | | A - spring-fed bogs & fens |
| *H. melanarius* Sturm | | | 2 | 7 | 3 | | 4 | 3 | 2 | 4 | 8 | A - peat mosses |
| *H. obscurus* Sturm | | | | 3 | | | 2 | 2 | | | | A |
| *H. tessellatus* Drapiez | | | 1 | | | | | | 1 | | | A - pools, running water |
| *Hydroporus* spp. | 3 | 5 | 4 | 2 | 12 | 1 | | 4 | | 1 | | A |
| *Graptodytes* sp. | | | 1 | | | | | | | | | A - pools, fen |
| *Agabus bipustulatus* (Linn.)/*striolatus* (Gyll.) | | | | | | | | | 1 | | | AW - forest pools with leaf detritus |
| *Agabus unguicularis* Thomson | | | 2 | | 3 | | | | 2 | 1 | | AM - marshy pools |
| *Agabus/Ilybius* sp. | | | 1 | 1 | | | 1 | | | | 2 | A |

| **Sample Number** | **17601** | **17401** | **17301** | **15801** | **13701** | **15601** | **10901** | **11501** | **13101** | **10401** | **12701** | **Habitat** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Context Number** | **176** | **174** | **173** | **158** | **137** | **156** | **109** | **115** | **131** | **104** | **127** | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| **Hydrophilidae** | | | | | | | | | | | | |
| *Cercyon sternalis* Sharp | | | | | | | | 1 | 6 | | | M - leaf debris, alder carr |
| *Cercyon* sp. | | 2 | 1 | | | | | | | 1 | | FV |
| *Megasternum obscurum* (Marsh.) | 2 | 7 | 3 | 6 | 2 | 2 | 6 | 1 | 4 | 1 | 2 | FV |
| *Cryptopleurum minutum* (Fab.) | | | | 1 | | | | | | | | FVC |
| *Paracymus scutellaris* (Rosen.) | 2 | 4 | 13 | 11 | 8 | | 9 | 14 | 11 | 10 | 3 | AM - shallow acid water |
| *Hydrobius fuscipes* (Linn.) | 1 | | | | | | 1 | | | | | AV - detritus ponds |
| *Anacaena bipustulata* (Marsh.) | | | | | 2 | | | 1 | | | | AV - stagnant water, silted pools etc. |
| | | | | | | | | | | | | |
| **Hydraenidae** | | | | | | | | | | | | |
| *Hydraena riparia* Kugel. | 42 | 50 | 34 | 16 | 7 | | | | | | 1 | A - stagnant water, fens |
| *Hydraena* sp. | | | | | 2 | 1 | 2 | 1 | 6 | 2 | | A |
| *Limnebius* sp. | | | 1 | 1 | | | | | | | | |
| | | | | | | | | | | | | |
| **Ptilidae** | | | | | | | | | | | | |
| *Ptenidium* sp. | | | 1 | | 1 | | | 1 | | | | VFW |
| *Ptilidae spp.* indet. | | 9 | 1 | | | | | | | 1 | | various |
| | | | | | | | | | | | | |
| **Leiodidae** | | | | | | | | | | | | |
| *Catops* sp. | | | | 1 | | 1 | | | 3 | | | V - often leaf litter or fungi in woods |
| *Agathidium rotundatum* Gyll. | | | | | | | 1 | | 2 | | | W - on fungi of pine species |
| | | | | | | | | | | | | |
| **Silphidae** | | | | | | | | | | | | |
| *Sipha* sp. | | | 1 | 1 | 1 | | | | 2 | | | CFV |
| | | | | | | | | | | | | |
| **Staphylinidae** | | | | | | | | | | | | |
| *Micropeplus* sp. | | | | | | | | | | | 1 | VBM |
| *Proteinus* sp. | | | 2 | | | | | | | | | MW - fungi of dead wood etc. |
| *Olophrum piceum* (Gyll.) | 3 | 6 | 5 | 14 | 9 | | 11 | 14 | 8 | 10 | 2 | VGT - predatory |
| *Acidota crenata* (Fab.) | 1 | 3 | | | | | 2 | 2 | 3 | | 3 | VTM - moist localities |
| *Lesteva heeri* Fauvel | 1 | 7 | 9 | 12 | 10 | | 7 | 4 | 9 | 5 | 3 | BM |
| *Lesteva* spp. | | | 7 | | | | 2 | | | 1 | 1 | BM |
| *Eusphalerum* sp. | | | 2 | | | | | | | | | TM - on flowers |

| **Sample Number** | **17601** | **17401** | **17301** | **15801** | **13701** | **15601** | **10901** | **11501** | **13101** | **10401** | **12701** | **Habitat** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Context Number** | **176** | **174** | **173** | **158** | **137** | **156** | **109** | **115** | **131** | **104** | **127** | |
| | | | | | | | | | | | | |
| **Staphylinidae (continued)** | | | | | | | | | | | | |
| *Phyllodrepa* sp. | | | | | | | | | | 1 | | V |
| *Dropephylla ioptera* (Stephens) | | | | | 4 | | | 3 | | | | W - under bark, in fungi |
| *Dropephylla* sp. | | | 2 | | | | 1 | | | | | WV |
| *Oxytelus fulvipes* Erich. | | 8 | 8 | | | | 1 | | | | | MB - under leaf litter, detritus |
| *Stenus* spp. | 4 | 5 | 12 | 17 | 13 | | 6 | 7 | 10 | 12 | 2 | TM |
| *Lathrobium* spp. | 12 | 20 | 22 | 25 | 17 | 4 | 23 | 13 | 41 | 24 | 13 | TV (C) |
| *Othius* sp. | | | | | | | | 1 | | | | V - predatory |
| *Gyrohypnus/Xantholinus* spp. | | | | 3 | | | 2 | | 2 | | | TVM |
| *Philonthus* spp. | | | | | | | 2 | 2 | | 3 | | FVC (T) |
| *Staphylinus olens* Müller | | | | | | | 1 | | | | | V- predator |
| *Staphylinus* sp. | | 1 | | | | | | | | | | VFC (T) |
| *Quedius* spp. | | 2 | | 4 | | | 3 | | | | | V - predatory, W - fungi |
| *Philonthus/Quedius* spp. | | | 3 | | 5 | | | 1 | 6 | | 1 | as above |
| *Tachyporus/Tachinus* sp. | | | | | | | 1 | | | | | W (V) - under bark, in fungi |
| *?Crataraea suturalis* (Manner.) | | | | | | | | 1 | 8 | | | VF - in ants nests |
| *Aleocharinae* spp. indet. | | 6 | 4 | 6 | 8 | | 3 | | 3 | 1 | | various |
| | | | | | | | | | | | | |
| **Pselaphidae** | | | | | | | | | | | | |
| *Bryaxis* spp. | 8 | 22 | 5 | 3 | 3 | | | 3 | 7 | 6 | 1 | MW - moss and under bark |
| *Tychus* sp. | | 1 | 4 | 3 | 1 | | 2 | 2 | 1 | 1 | 1 | MW - moss and under bark |
| | | | | | | | | | | | | |
| **Geotrupidae** | | | | | | | | | | | | |
| *Geotrupes* sp. | | | 1 | 1 | 1 | | 1 | | 1 | 1 | | F - dung |
| | | | | | | | | | | | | |
| **Scarabaeidae** | | | | | | | | | | | | |
| *Aphodius* sp. | | 1 | | | | | | | 1 | | | FV - mostly dung |
| | | | | | | | | | | | | |
| **Scirtidae** | | | | | | | | | | | | |
| *Cyphon* spp. indet. | 22 | 23 | 23 | 15 | | | 7 | 4 | 42 | 5 | 2 | Lavae A, adults T but close to water, M |

| **Sample Number** | **17601** | **17401** | **17301** | **15801** | **13701** | **15601** | **10901** | **11501** | **13101** | **10401** | **12701** | **Habitat** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Context Number** | **176** | **174** | **173** | **158** | **137** | **156** | **109** | **115** | **131** | **104** | **127** | |
| | | | | | | | | | | | | |
| **Elateridae** | | | | | | | | | | | | |
| *Melanotus erythropus* (Gm. In Linn.) | | | | | | | 1 | | | | | W - damp rotting wood, predator of other insects |
| *Melanotus cf. Erythropus* (Gm. In Linn.) | | | | | | 1 | | | | | | as above |
| *Cidnopus minutus* (Linn.) | | | 1 | | 1 | | | | | | | W |
| *Athous hirtus* (Herbst) | | | | 1 | | | | | | | | W - develops in wood, found on shrubs, flowers |
| *Selatosomus bipustulatus* (Linn.) | | | 1 | | | | | | | | | W - develops in rotting wood |
| Elateridae gen. et sp. indet. | | | | | | | | | | | 1 | WTV - also predatory |
| | | | | | | | | | | | | |
| **Anobiidae** | | | | | | | | | | | | |
| *Grynobius planus* (Fab.) | | | | | | | | | | 2 | | W - dry, dead wood of oak, beech |
| | | | | | | | | | | | | |
| **Ptinidae** | | | | | | | | | | | | |
| *Ptinus fur* (Linn.) | 1 | | | | | | | | | | 1 | W - birds nests, under bark, in fungi |
| | | | | | | | | | | | | |
| **Rhizophagidae** | | | | | | | | | | | | |
| *Rhizophagus* sp. | 1 | | 1 | | 1 | | | | 1 | | | W |
| | | | | | | | | | | | | |
| **Sphindidae** | | | | | | | | | | | | |
| *Aspidiphorus orbiculatus* (Gyll.) | | | | | | | 1 | | | | | W - breeds in *Myxomycetes* spp on old timber |
| | | | | | | | | | | | | |
| **Cryptophagidae** | | | | | | | | | | | | |
| *Atomaria* sp. | 1 | | 1 | | | 1 | | | | 3 | 1 | V (W) |
| | | | | | | | | | | | | |
| **Cerylonidae** | | | | | | | | | | | | |
| *Cerylon fagi* Brisout | | | | | | | | | 1 | | | W - ancient broad-leaved woodland, beech & oak |
| *C. ferrugineum* Stephens | | | | | | 2 | | | | | | W - various trees, under bark & in fungi |
| *C. histeroides* (Fab.) | | 2 | | | | 2 | | | | | | W - under bark on dead trees in early stages of decay |
| *Cerylon* sp. | | | | 1 | | | 1 | | | | | W |

| **Sample Number** | **17601** | **17401** | **17301** | **15801** | **13701** | **15601** | **10901** | **11501** | **13101** | **10401** | **12701** | **Habitat** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Context Number** | **176** | **174** | **173** | **158** | **137** | **156** | **109** | **115** | **131** | **104** | **127** | |
| | | | | | | | | | | | | |
| **Lathridiidae** | | | | | | | | | | | | |
| *Lathridius* sp. | | | | | | | 1 | | | | 1 | V - in fungi, decaying plant/leaf litter |
| *Corticaria* sp. | | 1 | | | 6 | | 3 | 1 | 1 | | 1 | W (M) - decaying plant matter |
| | | | | | | | | | | | | |
| **Scraptiidae** | | | | | | | | | | | | |
| *Anaspis* sp. | | 1 | | | | | | | | | | W - develops in dead wood, adults on flowers |
| | | | | | | | | | | | | |
| **Chrysomelidae** | | | | | | | | | | | | |
| *Plateumaris sericea* (Linn.) | | | | 11 | 5 | | 13 | 16 | | 8 | 1 | M - Carex, *Iris pseudacorus* etc. |
| *Chrysolina* sp. | 1 | | 1 | | | | | | | | | MT - various plant species |
| *Phyllotreta* sp. | | | | | 1 | | | | | | | TM - various wild crucifers |
| *Chrysomelidae* sp. indet. | | | | | 1 | | | | | | | MTW |
| | | | | | | | | | | | | |
| **Attelabidae** | | | | | | | | | | | | |
| *Rhynchites* sp. | | | 1 | | | | | | | | | W - on oak, birch, willow |
| | | | | | | | | | | | | |
| **Apionidae** | | | | | | | | | | | | |
| *Apion* spp. | 1 | 3 | 1 | 1 | 5 | | 4 | 1 | 3 | 2 | 2 | MTW - various herbs |

| **Sample Number** | **17601** | **17401** | **17301** | **15801** | **13701** | **15601** | **10901** | **11501** | **13101** | **10401** | **12701** | **Habitat** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Context Number** | **176** | **174** | **173** | **158** | **137** | **156** | **109** | **115** | **131** | **104** | **127** | |
| | | | | | | | | | | | | |
| **Curculionidae** | | | | | | | | | | | | |
| *Phyllobius maculicornis* Germar | | | | 1 | 1 | | | 1 | 3 | | | W - defoliator of oak, birch |
| *Polydrusus mollis* (Strom) | | | | 1 | 1 | | | | | | | W - oak, birch, hazel |
| *Polydrusus* sp. | | 1 | | | | | 2 | | 2 | 1 | 2 | WM |
| *Strophosomus melanogrammus* (Forster) | | | 1 | 5 | 2 | | 2 | | 3 | 1 | | W - defoliator of oak, birch, hazel |
| *Rhyncolus ater* (Linn.) | 1 | | 4 | 1 | 1 | 1 | 1 | | 2 | | 1 | W - pine, oak |
| *Ceuthorhynchus* sp. | | 1 | 1 | | | | 1 | | | | | BTM - various plant species |
| *Rhynchaenus fagi* (Linn.) | | | | 2 | | | | | | | | W - beech and oak |
| *Rhynchaenus ? avellanae* (Donovan) | 2 | | 2 | | 3 | | 2 | 1 | | | | W - oak, hazel leaves |
| *R. quercus* (Linn.) | | | 2 | | | | | 2 | 4 | 1 | 1 | W - oak leaf miner |
| *R. pillosus* (Fab.) | | | | | 2 | | | | | | | W - oak leaf miner |
| *Rhynchaenus* spp. | 2 | 4 | | | | | | | | | | W - as above |
| | | | | | | | | | | | | |
| **Scolytidae** | | | | | | | | | | | | |
| *Dryocoetinus villosus* (Fab.) | | | | | | | | | 3 | | | W - oak, beech under thick bark (old woodland) |
| *Trypodendron* sp. | | | | | | | | | 1 | | | W - oak, beech felled or recently dead |
| | | | | | | | | | | | | |
| **Total number of individuals** | **115** | **205** | **206** | **196** | **163** | **16** | **160** | **123** | **226** | **127** | **61** | |

*Table 3. Basic statistics for insect remains from Parks of Garden, Stirlingshire (including summary by habitat group). Key: n– number of individuals.*

| **Sample No.** | **17601** | **17401** | **17301** | **15801** | **13701** | **15601** | **10901** | **11501** | **13101** | **10401** | **12701** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Context No.** | **176** | **174** | **173** | **158** | **137** | **156** | **109** | **115** | **131** | **104** | **127** |
| **Sample Size (kg)** | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| **No. of individuals (N)** | 115 | 205 | 206 | 196 | 163 | 16 | 160 | 123 | 226 | 127 | 61 |
| **No. of taxa (min.) (S)** | 24 | 31 | 46 | 38 | 39 | 10 | 45 | 35 | 43 | 35 | 28 |
| **Index of diversity (alpha)** | 9 | 10 | 19 | 14 | 16 | n/a | 21 | 17 | 16 | 16 | 21 |
| **SE of alpha** | 1 | 1 | 2 | 2 | 2 | n/a | 3 | 2 | 2 | 2 | 4 |
| **n aquatics** | 47 | 59 | 59 | 41 | 41 | | 19 | 27 | 26 | 18 | 14 |
| **% aquatics** | 41.7 | 28.8 | 28.6 | 20.9 | 25.1 | | 11.8 | 22 | 11.5 | 14.2 | 23 |
| **n marsh/fen/bog** | 42 | 69 | 77 | 73 | 52 | | 69 | 52 | 88 | 55 | 19 |
| **% marsh/fen/bog** | 35.6 | 33.7 | 37.4 | 37.2 | 32 | | 43.1 | 42.3 | 38.9 | 43.3 | 31.1 |
| **n woodland/dead wood** | 8 | 10 | 16 | 23 | 19 | | 14 | 8 | 23 | 8 | 6 |
| **% woodland/dead wood** | 6.9 | 4.8 | 7.8 | 11.7 | 11.6 | | 8.7 | 6.5 | 10.2 | 6.3 | 9.8 |
| **n foul/dung/rotting veg.** | 18 | 62 | 53 | 59 | 50 | | 58 | 36 | 86 | 45 | 22 |
| **% foul/dung/rotting veg.** | 15.6 | 30.2 | 25.7 | 30.1 | 30.7 | | 36.3 | 29.3 | 38 | 35.4 | 36 |
| **n dryland/pasture** | 1 | 5 | 1 | 0 | 1 | | 0 | 0 | 3 | 1 | 0 |
| **% dryland/pasture** | 0.9 | 2.4 | 0.5 | 0 | 0.6 | | 0 | 0 | 1.3 | 0.7 | 0 |

# Appendix 2

*Insect species lists in rank order by sample and summary figures*

*Table 4. Rank order statistics for insect remains from Parks of Garden, Stirlingshire.*

| **Taxon (Sample 17601)** | **N** | **Rank** | **%** |
|---|---|---|---|
| Hydraena riparia Kugel. | 42 | 1 | 36.52 |
| Cyphon spp. indet. | 22 | 2 | 19.13 |
| Lathrobium spp. | 12 | 3 | 10.43 |
| Bryaxis spp. | 8 | 4 | 6.96 |
| Stenus spp. | 4 | 5 | 3.48 |
| Olophrum piceum (Gyll.) | 3 | 6 | 2.61 |
| Hydroporus spp. | 3 | 6 | 2.61 |
| Rhynchaenus spp. | 2 | 8 | 1.74 |
| Rhynchaenus ? avellanae (Donovan) | 2 | 8 | 1.74 |
| Paracymus scutellaris (Rosen.) | 2 | 8 | 1.74 |
| Megasternum obscurum (Marsh.) | 2 | 8 | 1.74 |
| Rhyncolus ater (Linn.) | 1 | 12 | 0.87 |
| Rhizophagus sp. | 1 | 12 | 0.87 |
| Ptinus fur (Linn.) | 1 | 12 | 0.87 |
| Pterostichus sp. | 1 | 12 | 0.87 |
| Pterostichus nigrita (Payk.) | 1 | 12 | 0.87 |
| Lesteva heeri Fauvel | 1 | 12 | 0.87 |
| Hydrobius fuscipes (Linn.) | 1 | 12 | 0.87 |
| Chrysolina sp. | 1 | 12 | 0.87 |
| Bembidion sp. | 1 | 12 | 0.87 |
| Atomaria sp. | 1 | 12 | 0.87 |
| Apion spp. | 1 | 12 | 0.87 |
| Agonum fuliginosum (Panz.) | 1 | 12 | 0.87 |
| Acidota crenata (Fab.) | 1 | 12 | 0.87 |
| **Total** | **115** | | |

| **Taxon (Sample 17401)** | **N** | **Rank** | **%** |
|---|---|---|---|
| Hydraena riparia Kugel. | 50 | 1 | 24.39 |
| Cyphon spp. indet. | 23 | 2 | 11.22 |
| Bryaxis spp. | 22 | 3 | 10.73 |
| Lathrobium spp. | 20 | 4 | 9.76 |
| Ptilidae gen. et sp. indet. | 9 | 5 | 4.39 |
| Oxytelus fulvipes Erich. | 8 | 6 | 3.90 |
| Megasternum obscurum (Marsh.) | 7 | 7 | 3.41 |
| Lesteva heeri Fauvel | 7 | 7 | 3.41 |
| Olophrum piceum (Gyll.) | 6 | 9 | 2.93 |
| Aleocharinae gen. et sp. indet. | 6 | 9 | 2.93 |
| Bembidion sp. | 5 | 11 | 2.44 |
| Hydroporus spp. | 5 | 11 | 2.44 |
| Stenus spp. | 5 | 11 | 2.44 |
| Paracymus scutellaris (Rosen.) | 4 | 14 | 1.95 |
| Rhynchaenus spp. | 4 | 14 | 1.95 |
| Acidota crenata (Fab.) | 3 | 16 | 1.46 |
| Apion spp. | 3 | 16 | 1.46 |
| Pterostichus strenuus (Panz.) | 2 | 18 | 0.98 |
| Cercyon sp. | 2 | 18 | 0.98 |
| Quedius spp. | 2 | 18 | 0.98 |
| Cerylon histeroides (Fab.) | 2 | 18 | 0.98 |
| Leistus rufescens (Fab.) | 1 | 21 | 0.49 |
| Trechus sp. | 1 | 21 | 0.49 |
| Pterostichus sp. | 1 | 21 | 0.49 |
| Staphylinus sp. | 1 | 21 | 0.49 |
| Tychus sp. | 1 | 21 | 0.49 |
| Aphodius sp. | 1 | 21 | 0.49 |
| Corticaria sp. | 1 | 21 | 0.49 |
| Anaspis sp. | 1 | 21 | 0.49 |
| Polydrusus sp. | 1 | 21 | 0.49 |
| Ceuthorhynchus sp. | 1 | 21 | 0.49 |
| **Total** | **205** | | |

| **Taxon (Sample 17301)** | **N** | **Rank** | **%** |
|---|---|---|---|
| Hydraena riparia Kugel. | 34 | 1 | 16.50 |
| Cyphon spp. indet. | 23 | 2 | 11.17 |
| Lathrobium spp. | 22 | 3 | 10.68 |
| Paracymus scutellaris (Rosen.) | 13 | 4 | 6.31 |
| Stenus spp. | 12 | 5 | 5.83 |
| Lesteva heeri Fauvel | 9 | 6 | 4.37 |
| Oxytelus fulvipes Erich. | 8 | 7 | 3.88 |
| Lesteva spp. | 7 | 8 | 3.40 |
| Pterostichus diligens (Sturm) | 5 | 9 | 2.43 |
| Olophrum piceum (Gyll.) | 5 | 9 | 2.43 |
| Bryaxis spp. | 5 | 9 | 2.43 |
| Agonum spp. | 4 | 12 | 1.94 |
| Hydroporus spp. | 4 | 12 | 1.94 |
| Aleocharinae gen. et sp. indet. | 4 | 12 | 1.94 |
| Tychus sp. | 4 | 12 | 1.94 |
| Rhyncolus ater (Linn.) | 4 | 12 | 1.94 |
| Agonum fuliginosum (Panz.) | 3 | 17 | 1.46 |
| Megasternum obscurum (Marsh.) | 3 | 17 | 1.46 |
| Philonthus/Quedius spp. | 3 | 17 | 1.46 |
| Hydroporus melanarius Sturm | 2 | 20 | 0.97 |
| Agabus unguicularis Thomson | 2 | 20 | 0.97 |
| Proteinus sp. | 2 | 20 | 0.97 |
| Eusphalerum sp. | 2 | 20 | 0.97 |
| Dropephylla sp. | 2 | 20 | 0.97 |
| Rhynchaenus ? avellanae (Donovan) | 2 | 20 | 0.97 |
| R. quercus (Linn.) | 2 | 20 | 0.97 |
| Bembidion sp. | 1 | 27 | 0.49 |
| Pterostichus minor (Gyll.) | 1 | 27 | 0.49 |
| Hydroporus tessellatus Drapiez | 1 | 27 | 0.49 |
| Graptodytes sp. | 1 | 27 | 0.49 |
| Agabus/Ilybius sp. | 1 | 27 | 0.49 |
| Cercyon sp. | 1 | 27 | 0.49 |
| Limnebius sp. | 1 | 27 | 0.49 |
| Ptenidium sp. | 1 | 27 | 0.49 |
| Ptilidae gen. et sp. indet. | 1 | 27 | 0.49 |
| Sipha sp. | 1 | 27 | 0.49 |
| Geotrupes sp. | 1 | 27 | 0.49 |
| Cidnopus minutus (Linn.) | 1 | 27 | 0.49 |
| Selatosomus bipustulatus (Linn.) | 1 | 27 | 0.49 |
| Rhizophagus sp. | 1 | 27 | 0.49 |
| Atomaria sp. | 1 | 27 | 0.49 |
| Chrysolina sp. | 1 | 27 | 0.49 |
| Rhynchites sp. | 1 | 27 | 0.49 |
| Apion spp. | 1 | 27 | 0.49 |
| Strophosomus melanogrammus (Forster) | 1 | 27 | 0.49 |
| Ceuthorhynchus sp. | 1 | 27 | 0.49 |
| **Total** | **206** | | |

| **Taxon (Sample 15801)** | **N** | **Rank** | **%** |
|---|---|---|---|
| Lathrobium spp. | 25 | 1 | 12.76 |
| Stenus spp. | 17 | 2 | 8.67 |
| Hydraena riparia Kugel. | 16 | 3 | 8.16 |
| Cyphon spp. indet. | 15 | 4 | 7.65 |
| Olophrum piceum (Gyll.) | 14 | 5 | 7.14 |
| Lesteva heeri Fauvel | 12 | 6 | 6.12 |
| Paracymus scutellaris (Rosen.) | 11 | 7 | 5.61 |
| Plateumaris sericea (Linn.) | 11 | 7 | 5.61 |
| Trechus quadristriatus (Schrank) | 8 | 9 | 4.08 |
| Hydroporus melanarius Sturm | 7 | 10 | 3.57 |
| Megasternum obscurum (Marsh.) | 6 | 11 | 3.06 |
| Aleocharinae gen. et sp. indet. | 6 | 11 | 3.06 |
| Strophosomus melanogrammus (Forster) | 5 | 13 | 2.55 |
| Agonum fuliginosum (Panz.) | 4 | 14 | 2.04 |
| Quedius spp. | 4 | 14 | 2.04 |
| Pterostichus diligens (Sturm) | 3 | 16 | 1.53 |
| Hydroporus obscurus Sturm | 3 | 16 | 1.53 |
| Gyrohypnus/Xantholinus spp. | 3 | 16 | 1.53 |
| Bryaxis spp. | 3 | 16 | 1.53 |
| Tychus sp. | 3 | 16 | 1.53 |
| Hydroporus spp. | 2 | 21 | 1.02 |
| Rhynchaenus fagi (Linn.) | 2 | 21 | 1.02 |
| Notiophilus biguttatus (Fab.) | 1 | 23 | 0.51 |
| Pterostichus minor (Gyll.) | 1 | 23 | 0.51 |
| P. nigrita (Payk.) | 1 | 23 | 0.51 |
| P. strenuus (Panz.) | 1 | 23 | 0.51 |
| Agabus/Ilybius sp. | 1 | 23 | 0.51 |
| Cryptopleurum minutum (Fab.) | 1 | 23 | 0.51 |
| Limnebius sp. | 1 | 23 | 0.51 |
| Catops sp. | 1 | 23 | 0.51 |
| Sipha sp. | 1 | 23 | 0.51 |
| Geotrupes sp. | 1 | 23 | 0.51 |
| Athous hirtus (Herbst) | 1 | 23 | 0.51 |
| Cerylon sp. | 1 | 23 | 0.51 |
| Apion spp. | 1 | 23 | 0.51 |
| Phyllobius maculicornis Germar | 1 | 23 | 0.51 |
| Polydrusus mollis (Strom) | 1 | 23 | 0.51 |
| Rhyncolus ater (Linn.) | 1 | 23 | 0.51 |
| **Total** | **196** | | |

| **Taxon (Sample 13701)** | **N** | **Rank** | **%** |
|---|---|---|---|
| Lathrobium spp. | 17 | 1 | 10.43 |
| Stenus spp. | 13 | 2 | 7.98 |
| Hydroporus spp. | 12 | 3 | 7.36 |
| Lesteva heeri Fauvel | 10 | 4 | 6.13 |
| Olophrum piceum (Gyll.) | 9 | 5 | 5.52 |
| Paracymus scutellaris (Rosen.) | 8 | 6 | 4.91 |
| Aleocharinae gen. et sp. indet. | 8 | 6 | 4.91 |
| Hydraena riparia Kugel. | 7 | 8 | 4.29 |
| Pterostichus diligens (Sturm) | 6 | 9 | 3.68 |
| Corticaria sp. | 6 | 9 | 3.68 |
| Philonthus/Quedius spp. | 5 | 11 | 3.07 |
| Plateumaris sericea (Linn.) | 5 | 11 | 3.07 |
| Apion spp. | 5 | 11 | 3.07 |
| Pterostichus minor (Gyll.) | 4 | 14 | 2.45 |
| Agonum fuliginosum (Panz.) | 4 | 14 | 2.45 |
| Dropephylla ioptera (Stephens) | 4 | 14 | 2.45 |
| Pterostichus oblongopunctatus (Fab.) | 3 | 17 | 1.84 |
| Hydroporus angustatus Sturm | 3 | 17 | 1.84 |
| H. melanarius Sturm | 3 | 17 | 1.84 |
| Agabus unguicularis Thomson | 3 | 17 | 1.84 |
| Bryaxis spp. | 3 | 17 | 1.84 |
| Rhynchaenus ? avellanae (Donovan) | 3 | 17 | 1.84 |
| Megasternum obscurum (Marsh.) | 2 | 23 | 1.23 |
| Hydraena sp. | 2 | 23 | 1.23 |
| Strophosomus melanogrammus (Forster) | 2 | 23 | 1.23 |
| Rhynchaenus pillosus (Fab.) | 2 | 23 | 1.23 |
| Anacaena bipustulata (Marsh.) | 2 | 23 | 1.23 |
| Hydroporus cf. longicornis Sharp | 1 | 28 | 0.61 |
| Ptenidium sp. | 1 | 28 | 0.61 |
| Sipha sp. | 1 | 28 | 0.61 |
| Tychus sp. | 1 | 28 | 0.61 |
| Geotrupes sp. | 1 | 28 | 0.61 |
| Cidnopus minutus (Linn.) | 1 | 28 | 0.61 |
| Rhizophagus sp. | 1 | 28 | 0.61 |
| Phyllotreta sp. | 1 | 28 | 0.61 |
| Chrysomelidae gen. et sp. indet. | 1 | 28 | 0.61 |
| Phyllobius maculicornis Germar | 1 | 28 | 0.61 |
| Polydrusus mollis (Strom) | 1 | 28 | 0.61 |
| Rhyncolus ater (Linn.) | 1 | | |
| **Total** | **163** | | |

| **Taxon (Sample 10901)** | **N** | **Rank** | **%** |
|---|---|---|---|
| Lathrobium spp. | 23 | 1 | 14.38 |
| Plateumaris sericea (Linn.) | 13 | 2 | 8.13 |
| Olophrum piceum (Gyll.) | 11 | 3 | 6.88 |
| Pterostichus diligens (Sturm) | 10 | 4 | 6.25 |
| Paracymus scutellaris (Rosen.) | 9 | 5 | 5.63 |
| Lesteva heeri Fauvel | 7 | 6 | 4.38 |
| Cyphon spp. indet. | 7 | 6 | 4.38 |
| Pterostichus strenuus (Panz.) | 6 | 8 | 3.75 |
| Megasternum obscurum (Marsh.) | 6 | 8 | 3.75 |
| Stenus spp. | 6 | 8 | 3.75 |
| Agonum fuliginosum (Panz.) | 4 | 11 | 2.50 |
| Hydroporus melanarius Sturm | 4 | 11 | 2.50 |
| Apion spp. | 4 | 11 | 2.50 |
| Pterostichus sp. | 3 | 14 | 1.88 |
| Quedius spp. | 3 | 14 | 1.88 |
| Aleocharinae gen. et sp. indet. | 3 | 14 | 1.88 |
| Corticaria sp. | 3 | 14 | 1.88 |
| Hydroporus obscurus Sturm | 2 | 18 | 1.25 |
| Hydraena sp. | 2 | 18 | 1.25 |
| Acidota crenata (Fab.) | 2 | 18 | 1.25 |
| Lesteva spp. | 2 | 18 | 1.25 |
| Gyrohypnus/Xantholinus spp. | 2 | 18 | 1.25 |
| Philonthus spp. | 2 | 18 | 1.25 |
| Tychus sp. | 2 | 18 | 1.25 |
| Polydrusus sp. | 2 | 18 | 1.25 |
| Strophosomus melanogrammus (Forster) | 2 | 18 | 1.25 |
| Rhynchaenus ? avellanae (Donovan) | 2 | 18 | 1.25 |
| Trechus sp. | 1 | 28 | 0.63 |
| Pterostichus minor (Gyll.) | 1 | 28 | 0.63 |
| P. niger (Schaller) | 1 | 28 | 0.63 |
| Agonum spp. | 1 | 28 | 0.63 |
| Agabus/Ilybius sp. | 1 | 28 | 0.63 |
| Hydrobius fuscipes (Linn.) | 1 | 28 | 0.63 |
| Agathidium rotundatum Gyll. | 1 | 28 | 0.63 |
| Dropephylla sp. | 1 | 28 | 0.63 |
| Oxytelus fulvipes Erich. | 1 | 28 | 0.63 |
| Staphylinus olens Muller | 1 | 28 | 0.63 |
| Tachyporus/Tachinus sp. | 1 | 28 | 0.63 |
| Geotrupes sp. | 1 | 28 | 0.63 |
| Melanotus erythropus (Gmelin in Linn.) | 1 | 28 | 0.63 |
| Aspidiphorus orbiculatus (Gyll.) | 1 | 28 | 0.63 |
| Cerylon sp. | 1 | 28 | 0.63 |
| Lathridius sp. | 1 | 28 | 0.63 |
| Rhyncolus ater (Linn.) | 1 | 28 | 0.63 |
| Ceuthorhynchus sp. | 1 | 28 | 0.63 |
| **Total** | **160** | | |

| **Taxon (Sample 11501)** | **N** | **Rank** | **%** |
|---|---|---|---|
| Plateumaris sericea (Linn.) | 16 | 1 | 13.01 |
| Paracymus scutellaris (Rosen.) | 14 | 2 | 11.38 |
| Olophrum piceum (Gyll.) | 14 | 2 | 11.38 |
| Lathrobium spp. | 13 | 4 | 10.57 |
| Stenus spp. | 7 | 5 | 5.69 |
| Hydroporus spp. | 4 | 6 | 3.25 |
| Lesteva heeri Fauvel | 4 | 6 | 3.25 |
| Cyphon spp. indet. | 4 | 6 | 3.25 |
| Pterostichus diligens (Sturm) | 3 | 9 | 2.44 |
| P. nigrita (Payk.) | 3 | 9 | 2.44 |
| P. strenuus (Panz.) | 3 | 9 | 2.44 |
| Agonum fuliginosum (Panz.) | 3 | 9 | 2.44 |
| Hydroporus melanarius Sturm | 3 | 9 | 2.44 |
| Dropephylla ioptera (Stephens) | 3 | 9 | 2.44 |
| Bryaxis spp. | 3 | 9 | 2.44 |
| Hydroporus angustatus Sturm | 2 | 16 | 1.63 |
| H. obscurus Sturm | 2 | 16 | 1.63 |
| Acidota crenata (Fab.) | 2 | 16 | 1.63 |
| Philonthus spp. | 2 | 16 | 1.63 |
| Tychus sp. | 2 | 16 | 1.63 |
| Rhynchaenus quercus (Linn.) | 2 | 16 | 1.63 |
| Notiophilus biguttatus (Fab.) | 1 | 22 | 0.81 |
| Trechus sp. | 1 | 22 | 0.81 |
| Cercyon sternalis Sharp | 1 | 22 | 0.81 |
| Megasternum obscurum (Marsh.) | 1 | 22 | 0.81 |
| Anacaena bipustulata (Marsh.) | 1 | 22 | 0.81 |
| Hydraena sp. | 1 | 22 | 0.81 |
| Ptenidium sp. | 1 | 22 | 0.81 |
| Othius sp. | 1 | 22 | 0.81 |
| Philonthus/Quedius spp. | 1 | 22 | 0.81 |
| ?Crataraea suturalis (Manner.) | 1 | 22 | 0.81 |
| Corticaria sp. | 1 | 22 | 0.81 |
| Apion spp. | 1 | 22 | 0.81 |
| Phyllobius maculicornis Germar | 1 | 22 | 0.81 |
| Rhynchaenus ? avellanae (Donovan) | 1 | 22 | 0.81 |
| **Total** | **123** | | |

| **Taxon (Sample 13101)** | **N** | **Rank** | **%** |
|---|---|---|---|
| Cyphon spp. indet. | 42 | 1 | 18.58 |
| Lathrobium spp. | 41 | 2 | 18.14 |
| Paracymus scutellaris (Rosen.) | 11 | 3 | 4.87 |
| Stenus spp. | 10 | 4 | 4.42 |
| Lesteva heeri Fauvel | 9 | 5 | 3.98 |
| Olophrum piceum (Gyll.) | 8 | 6 | 3.54 |
| ?Crataraea suturalis (Manner.) | 8 | 6 | 3.54 |
| Pterostichus diligens (Sturm) | 7 | 8 | 3.10 |
| Bryaxis spp. | 7 | 8 | 3.10 |
| Cercyon sternalis Sharp | 6 | 10 | 2.65 |
| Hydraena sp. | 6 | 10 | 2.65 |
| Philonthus/Quedius spp. | 6 | 10 | 2.65 |
| Megasternum obscurum (Marsh.) | 4 | 13 | 1.77 |
| Rhynchaenus quercus (Linn.) | 4 | 13 | 1.77 |
| Bembidion sp. | 3 | 15 | 1.33 |
| Agonum spp. | 3 | 15 | 1.33 |
| Hydroporus cf. longicornis Sharp | 3 | 15 | 1.33 |
| Catops sp. | 3 | 15 | 1.33 |
| Acidota crenata (Fab.) | 3 | 15 | 1.33 |
| Aleocharinae gen. et sp. indet. | 3 | 15 | 1.33 |
| Apion spp. | 3 | 15 | 1.33 |
| Phyllobius maculicornis Germar | 3 | 15 | 1.33 |
| Strophosomus melanogrammus (Forster) | 3 | 15 | 1.33 |
| Dryocoetinus villosus (Fab.) | 3 | 15 | 1.33 |
| Agonum fuliginosum (Panz.) | 2 | 25 | 0.88 |
| Hydroporus melanarius Sturm | 2 | 25 | 0.88 |
| Agabus unguicularis Thomson | 2 | 25 | 0.88 |
| Agathidium rotundatum Gyll. | 2 | 25 | 0.88 |
| Sipha sp. | 2 | 25 | 0.88 |
| Gyrohypnus/Xantholinus spp. | 2 | 25 | 0.88 |
| Polydrusus sp. | 2 | 25 | 0.88 |
| Rhyncolus ater (Linn.) | 2 | 25 | 0.88 |
| Trechus quadristriatus (Schrank) | 1 | 33 | 0.44 |
| Pterostichus nigrita (Payk.) | 1 | 33 | 0.44 |
| Hydroporus tessellatus Drapiez | 1 | 33 | 0.44 |
| Agabus bipustulatus (Linn.)/striolatus (Gyll.) | 1 | 33 | 0.44 |
| Tychus sp. | 1 | 33 | 0.44 |
| Geotrupes sp. | 1 | 33 | 0.44 |
| Aphodius sp. | 1 | 33 | 0.44 |
| Rhizophagus sp. | 1 | 33 | 0.44 |
| Cerylon fagi Brisout | 1 | 33 | 0.44 |
| Corticaria sp. | 1 | 33 | 0.44 |
| Trypodendron sp. | 1 | 33 | 0.44 |
| **Total** | **226** | | |

| **Taxon (Sample 10401)** | **N** | **Rank** | **%** |
|---|---|---|---|
| Lathrobium spp. | 24 | 1 | 18.90 |
| Stenus spp. | 12 | 2 | 9.45 |
| Paracymus scutellaris (Rosen.) | 10 | 3 | 7.87 |
| Olophrum piceum (Gyll.) | 10 | 3 | 7.87 |
| Plateumaris sericea (Linn.) | 8 | 5 | 6.30 |
| Agonum fuliginosum (Panz.) | 7 | 6 | 5.51 |
| Bryaxis spp. | 6 | 7 | 4.72 |
| Lesteva heeri Fauvel | 5 | 8 | 3.94 |
| Cyphon spp. indet. | 5 | 8 | 3.94 |
| Pterostichus diligens (Sturm) | 4 | 10 | 3.15 |
| Hydroporus melanarius Sturm | 4 | 10 | 3.15 |
| Philonthus spp. | 3 | 12 | 2.36 |
| Atomaria sp. | 3 | 12 | 2.36 |
| Pterostichus strenuus (Panz.) | 2 | 14 | 1.57 |
| Hydraena sp. | 2 | 14 | 1.57 |
| Grynobius planus (Fab.) | 2 | 14 | 1.57 |
| Apion spp. | 2 | 14 | 1.57 |
| Trechus sp. | 1 | 18 | 0.79 |
| Bembidion sp. | 1 | 18 | 0.79 |
| Pterostichus minor (Gyll.) | 1 | 18 | 0.79 |
| P. niger (Schaller) | 1 | 18 | 0.79 |
| P. nigrita (Payk.) | 1 | 18 | 0.79 |
| Hydroporus spp. | 1 | 18 | 0.79 |
| Agabus unguicularis Thomson | 1 | 18 | 0.79 |
| Cercyon sp. | 1 | 18 | 0.79 |
| Megasternum obscurum (Marsh.) | 1 | 18 | 0.79 |
| Ptilidae gen. et sp. indet. | 1 | 18 | 0.79 |
| Lesteva spp. | 1 | 18 | 0.79 |
| Phyllodrepa sp. | 1 | 18 | 0.79 |
| Aleocharinae gen. et sp. indet. | 1 | 18 | 0.79 |
| Tychus sp. | 1 | 18 | 0.79 |
| Geotrupes sp. | 1 | 18 | 0.79 |
| Polydrusus sp. | 1 | 18 | 0.79 |
| Strophosomus melanogrammus (Forster) | 1 | 18 | 0.79 |
| R. quercus (Linn.) | 1 | 18 | 0.79 |
| **Total** | **127** | | |

| **Taxon (Sample 12701)** | **N** | **Rank** | **%** |
|---|---|---|---|
| Lathrobium spp. | 13 | 1 | 21.31 |
| Hydroporus melanarius Sturm | 8 | 2 | 13.11 |
| Paracymus scutellaris (Rosen.) | 3 | 3 | 4.92 |
| Acidota crenata (Fab.) | 3 | 3 | 4.92 |
| Lesteva heeri Fauvel | 3 | 3 | 4.92 |
| Agonum fuliginosum (Panz.) | 2 | 6 | 3.28 |
| Agabus/Ilybius sp. | 2 | 6 | 3.28 |
| Megasternum obscurum (Marsh.) | 2 | 6 | 3.28 |
| Olophrum piceum (Gyll.) | 2 | 6 | 3.28 |
| Stenus spp. | 2 | 6 | 3.28 |
| Cyphon spp. indet. | 2 | 6 | 3.28 |
| Apion spp. | 2 | 6 | 3.28 |
| Polydrusus sp. | 2 | 6 | 3.28 |
| Pterostichus sp. | 1 | 14 | 1.64 |
| Hydraena riparia Kugel. | 1 | 14 | 1.64 |
| Micropeplus sp. | 1 | 14 | 1.64 |
| Lesteva spp. | 1 | 14 | 1.64 |
| Philonthus/Quedius spp. | 1 | 14 | 1.64 |
| Bryaxis spp. | 1 | 14 | 1.64 |
| Tychus sp. | 1 | 14 | 1.64 |
| Elateridae gen. et sp. indet. | 1 | 14 | 1.64 |
| Ptinus fur (Linn.) | 1 | 14 | 1.64 |
| Atomaria sp. | 1 | 14 | 1.64 |
| Lathridius sp. | 1 | 14 | 1.64 |
| Corticaria sp. | 1 | 14 | 1.64 |
| Plateumaris sericea (Linn.) | 1 | 14 | 1.64 |
| Rhyncolus ater (Linn.) | 1 | 14 | 1.64 |
| Rhynchaenus quercus (Linn.) | 1 | 14 | 1.64 |
| **Total** | **61** | | |

*Fig. 1. Percentage by habitat grouping and sample for insect remains from Parks of Garden, Stirlingshire.*

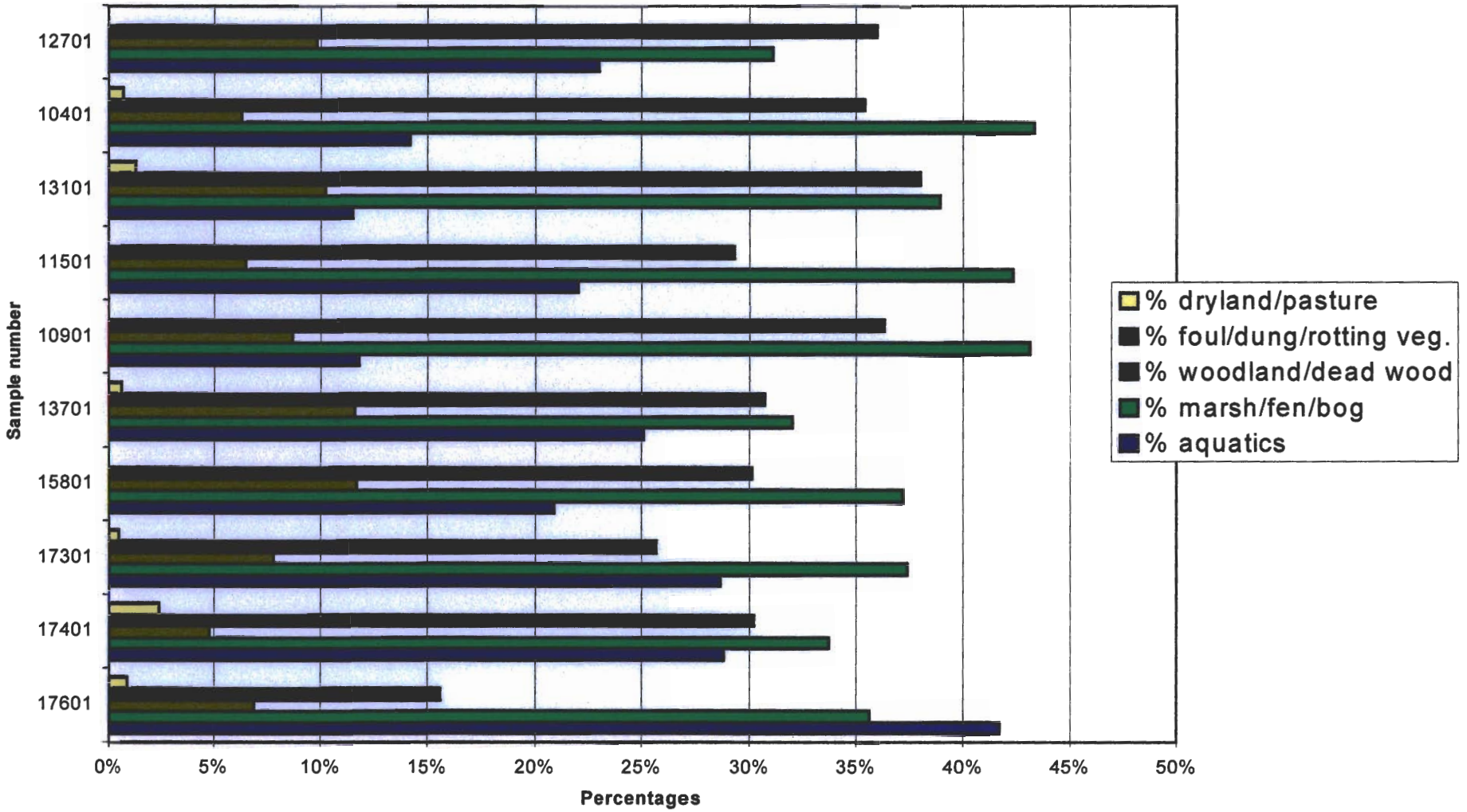

*Fig. 2. Index of diversity for insect remains from all samples except 15601 from Parks of Garden, Stirlingshire.*

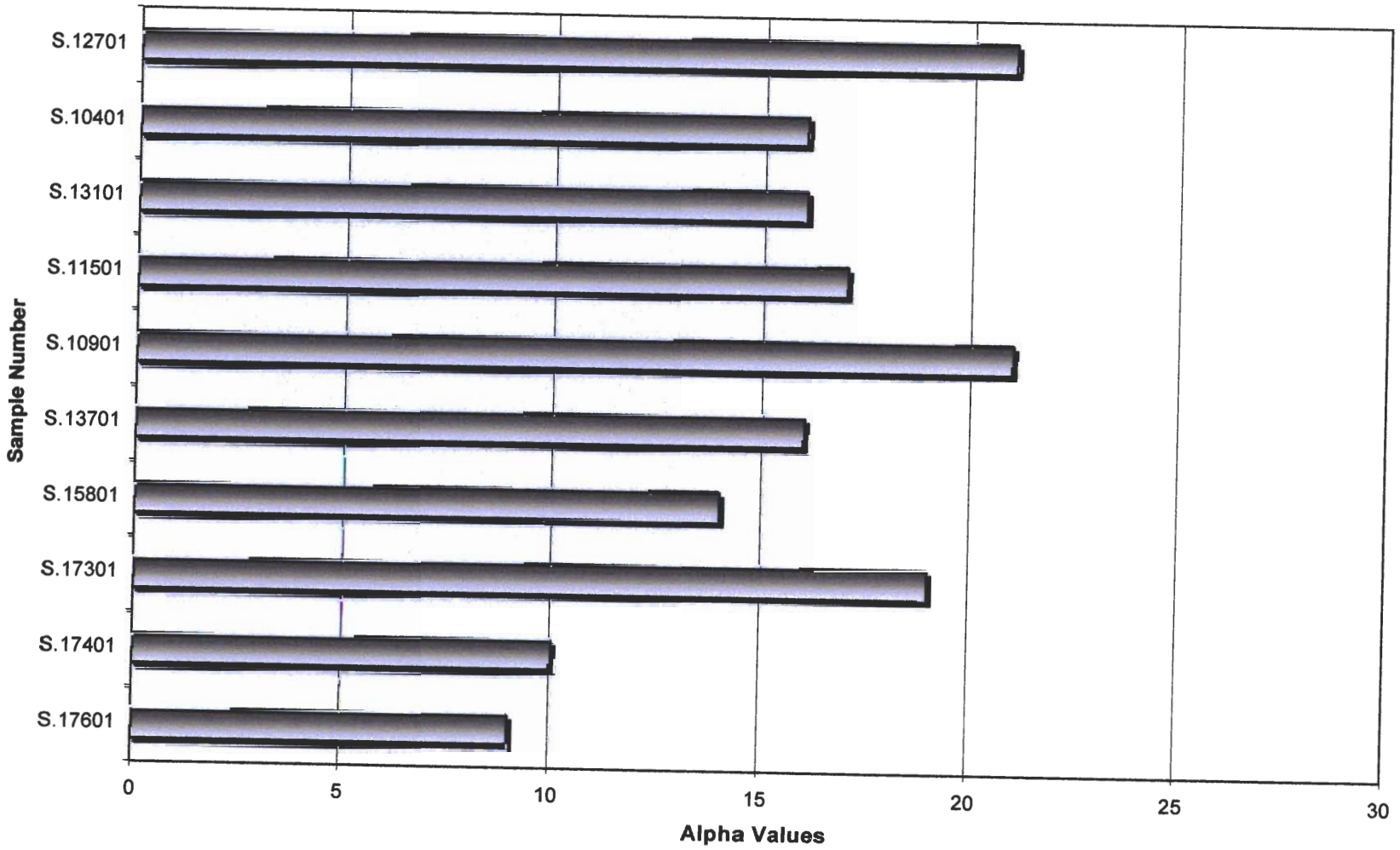

*Fig. 3. Rank order curves for insect remains from samples from Block 1 of Parks of Garden, Stirlingshire.*

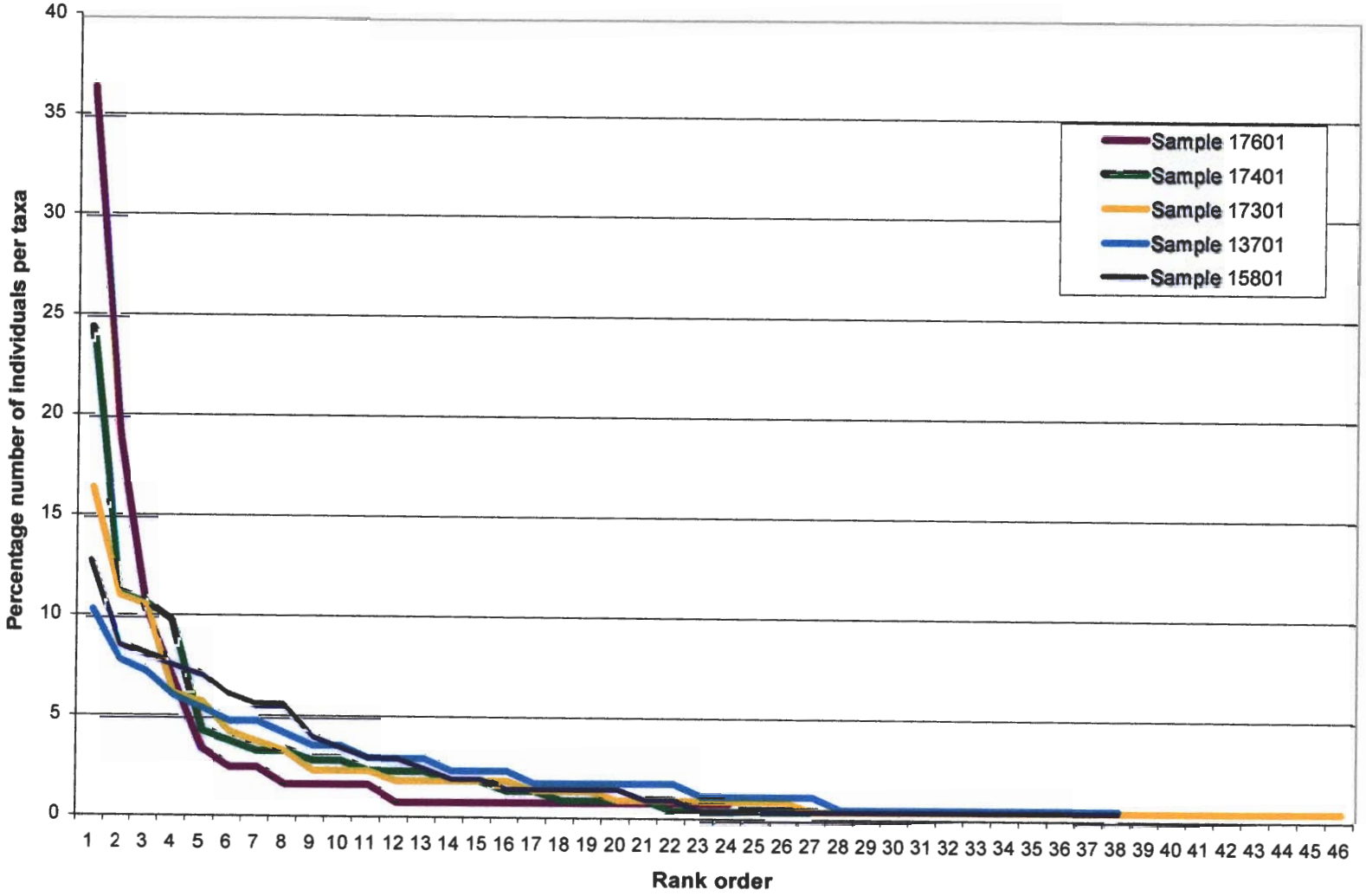

*Fig. 4. Rank order curves for insect remains from samples from Block 2 of Parks of Garden, Stirlingshire.*

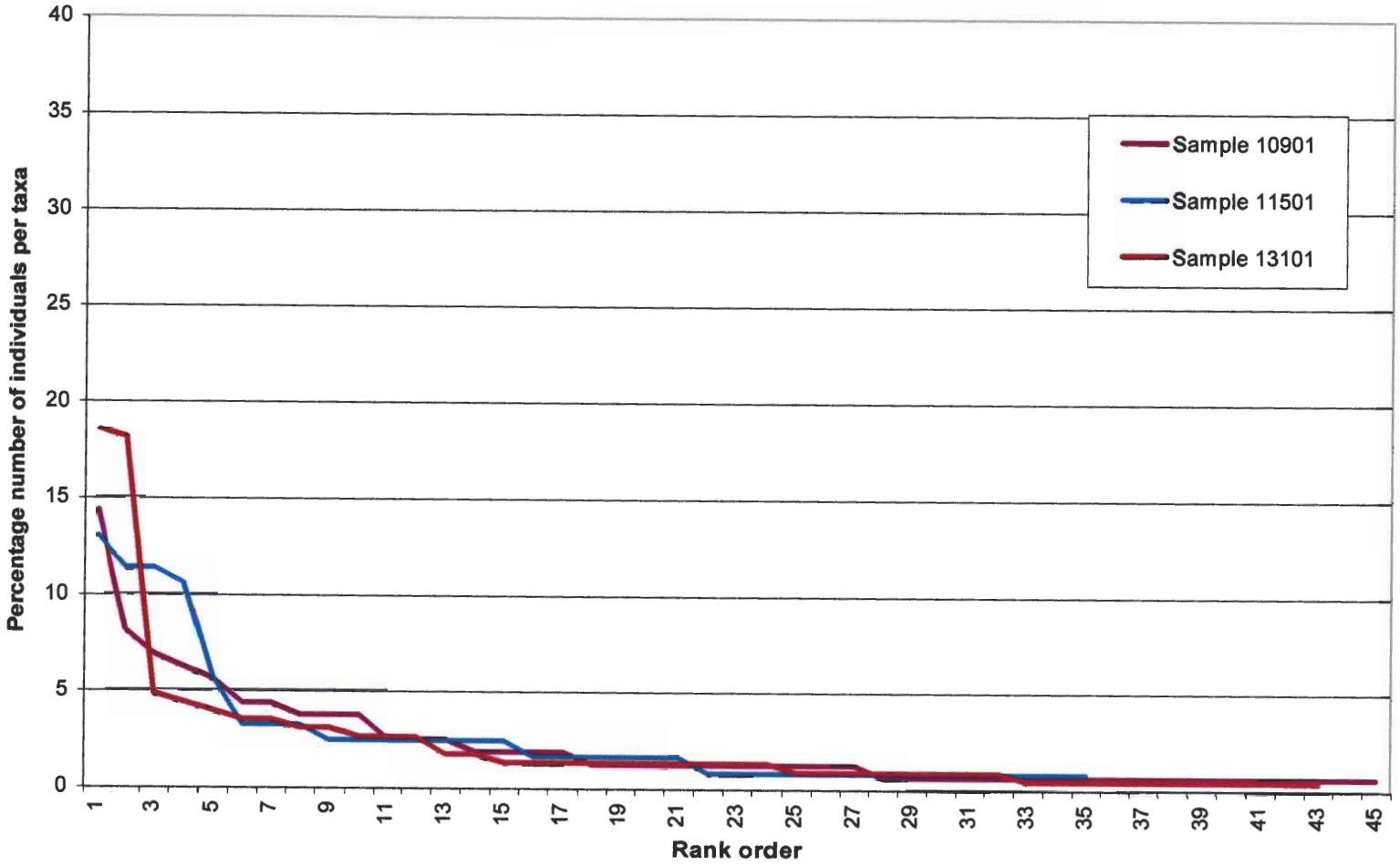

*Fig. 5. Rank order curves for insect remains from samples from Block 4 of Parks of Garden, Stirlingshire.*