

The beetles (Coleoptera) of Bingley Island: a preliminary check-list, with additional notes on history, ecology, bugs (Hemiptera) and flowering plants

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Synopsis

Lying close to the centre of Canterbury, England, Bingley Island is a small eyot in the Great Stour designated as a Local Nature Reserve and Local Wildlife Site. Bingley Island also forms part of Canterbury's Westgate Parks project which, in addition to infrastructure improvements, will encourage public engagement in numerous parks-based activities, including wildlife recording schemes to establish baseline data for assessing progress in improving the ecology of the area. A key element will be establishment and use of 'Westgate Parks Invertebrate Resource' (WPIR), a voucher collection and electronic archive to be hosted by Canterbury Christ Church University. WPIR will focus, at least initially, on the Coleoptera and non-biting midges (Diptera: Chironomidae). Following an introduction to the parks project and overviews of the archaeological history and general ecology of Bingley, the primary results of three fieldwork visits to the island during July and August 2012 are summarised as a preliminary check-list of 161 species of Coleoptera. The beetles encountered included four listed as nationally scarce, and one Red Data Book species, *Ptomaphagus varicornis* (Leiodidae) – of which a brief account is given. The opportunity was also taken to make preliminary surveys of the Hemiptera and flowering plants – amongst the 44 true bugs, *Tritomegas sexmaculatus* (Cydnidae) represents the third record of this recent arrival to Great Britain. Of the 45 plants recorded, *Carduus tenuiflorus* (Asteraceae) was the most noteworthy. It is anticipated that further surveys will add to these lists.

Key words: Bingley Island, Westgate Parks, Canterbury, check-lists, Coleoptera, Hemiptera, Angiospermae, archaeology, ecology, *Ptomaphagus varicornis*, *Tritomegas sexmaculatus*, *Carduus tenuiflorus*.

Introduction – Canterbury and the Westgate Parks project

The cathedral City of Canterbury has a municipal open space known as Westgate Gardens. Running south-west from the city's medieval Westgate Towers for about 340 m along both banks of the Great Stour, these riverside grounds once formed part of Tower House – now in civic use, but originally a private residence. Dating back to the Middle Ages (Crouch, 1970) and thought to be among the oldest publicly accessible parklands in the U.K., the house and its gardens were gifted to the city by Stephen and Catherine Williamson in 1936, to be used for the benefit of residents and visitors to Canterbury. Beneath the gardens are remains of some of the city's 2000-year-old Roman walls.

Since 2008 it has been a goal of Canterbury City Council to improve these formal gardens, and to integrate them with three adjacent open spaces – Toddlers Cove (a landscaped play area for children), Tannery Field (largely undeveloped), and Bingley Island. The Council's *Open Spaces Strategy* (CCC, 2009) identifies Westgate Gardens as one of Canterbury's principal historic parks, and that each town in the district should have a high quality park (*op. cit.*, pp. 14, 19). The Council's *Riverside Strategy* (CCC, 2003) sets out the guidelines for protection and enhancement in terms of providing accessible open spaces and protection of wildlife (*op. cit.*, pp. 3, 5).

In the research phase for a Heritage Lottery Fund 'Parks for People' application (see below), four distinct landscape character areas were identified. Westgate Gardens as formal landscape, Toddlers Cove for leisure and pleasure, Tannery Field as a transition from rural to early agriculture, and Bingley Island for conservation. This last area already has status as a Local Nature Reserve, under Canterbury City Council's existing *Local Plan* (CCC, 2006). The Plan also ensures compliance with and support of the Kent Biodiversity Action Plan (KBAP, 1997).

Together, these four areas, which run along the Great Stour from Westgate Towers almost as far as Hambrook Marshes, will create a linear public space to be called Westgate Parks. About 0.75 km in length and some 250 m across at its widest point, with a total area of *ca* 12 ha, the parks will form a transition from the city centre to open countryside beyond. The village of Chartham lies a further 4 km to the south-west, accessible via a riverside cycle path starting at the western end of Westgate Gardens (part of National Route 18 of the UK National Cycle Network).

Good quality parks and open spaces have beneficial impacts on local economies, ecological services and quality of life (UKNEA, 2011). Major aims of the Canterbury Westgate Parks project include local regeneration, growth of outdoor leisure by residents and tourists, development of a sense of place, improvement of green-space connectivity, preservation and revelation of the area's cultural heritage, maintenance of water flows, recovery of air quality, enrichment of biodiversity and habitats, and creation of educational opportunities and programmes.

The Council, supported by the Friends of Westgate Parks (FWP, 2012), submitted in February 2013 an application to the Heritage Lottery Fund Parks for People programme for a sum of approximately £770,000. CCC has already raised £300,000 from developer contributions and its own capital budgets. Most of this money will be used for improvements to infrastructure, public interpretation, and creation of better wildlife habitat, including improvements to the ecological condition of the river and its margins. These endeavours are predicated on generating a significant increase in public use and access. In addition, there is also a commitment to establish volunteer programmes aimed at gathering and disseminating knowledge about the rich, notably Roman history of the area, and the ecology and biodiversity of the parks and river.

Another intended outcome is an education and learning programme. Given the combination of cultural heritage and natural history, there is potential to develop a range of activities, events and projects that would cater for primary-age school children through the whole curriculum, and scope to provide projects for under and post-graduate data-gathering, monitoring, and citizen science projects.

Closely related is the requirement to increase the range of audiences and volunteers. Natural History is one of the few scientific disciplines left to which dedicated amateurs can still make valuable contributions. By concentrating on focal interest groups, such as beetles and butterflies, and carrying out surveys and analyses, amateur naturalists can develop their own skills and contribute to the pool of knowledge. It is anticipated that this aspect of the project will be carried out in partnership with one or more local conservation groups, including the Kentish Stour Countryside Partnership. Thus, if successful, the project will provide opportunities for education and citizen science (Tweddle *et al.*, 2012) at all ability levels.

Westgate Parks Invertebrate Resource

Urban parks and open spaces are increasingly seen as refuges for much wildlife that the modern agricultural landscape seems less and less able to support (UKNEA, 2011). However, not many habitat surveys have been carried out to

back that claim, and those studies that have been undertaken often employed differing methodologies, making it difficult to compare like for like.

As a result, we cannot tell with any degree of certainty exactly what wildlife urban parks can support effectively, and what park managers need or should do to improve habitat quality. Those surveys that have been carried out reveal a number of surprises, and even some endangered species may yet become indicators of urban park biodiversity value. However, species in urban parks have generally not been monitored and reviewed over time, and voucher material has rarely been obtained, let alone preserved as a resource for future use and validation. As a result, baseline data are both sparse and, to a greater or lesser extent, uncertain.

The current project on the beetles of Bingley Island is intended to form the basis of one of a small number of long-term and well-founded monitoring schemes for Canterbury's newly designated Westgate Parks. In support of such schemes, the objective of WPIR will be to create a voucher specimen collection and electronic archive for the study of invertebrates within the parks, with special reference to establishing baseline data on species living in the area, monitoring changes over time affecting invertebrate diversity, creating tools for the identification of invertebrates found in the parks, and engaging with school, college and university students, naturalists and other volunteers.

Through the development of sampling and identification programmes it is also intended to support educational programmes, biodiversity monitoring projects and original research based on the local invertebrate fauna. The voucher collections will be managed by volunteers and housed, for the foreseeable future, within the Biological Laboratory of the Department of Geographical and Life Sciences, Canterbury Christ Church University.

Even though all its component ecosystems are anthropogenic and, for the most part, disturbed, many hundreds of species of invertebrates await discovery in Westgate Parks. In light of this, it has been proposed that, although set up with potential to cater for any taxonomic group or ecosystem found within the parks, WPIR should focus initially on just two taxonomic groups and two ecosystems: the Diptera (true flies) that develop as larvae in the Great Stour within and upstream of the parks area, and the Coleoptera (beetles) of Bingley Island. The justification is that the likely most-diverse group to be found in the river will be the Chironomidae ('non-biting midges'), widely employed as indicators for water quality in fresh-water ecosystems, including lakes, streams and rivers, while the beetles are arguably amongst the best group for practical assessment of biodiversity in many terrestrial ecosystems (Hammond, 1994; see discussion in New, 2010). Work on river fauna will be done in consultation and collaboration with the Environment Agency. As well as underpinning studies on the future state of biodiversity within the parks, the beetle collection will also contribute baseline comparative data for beetle remains derived from environmental sampling of archaeological deposits excavated as part of the overall Westgate Parks project, as the community explores landscapes and ecologies past as well as present.

Bingley Island is currently and will continue to be set aside within the Westgate Parks complex as an urban nature reserve. The present paper, based on approximately 100 hours of field sampling by volunteers during summer 2012, is a first step towards establishing baseline data for the beetles to be found on the

island. Specimens of almost all the species recorded have already been passed to WPIR as vouchers, forming a collection which amateur entomologists and other volunteers will be invited to augment in future. Enquiries regarding WPIR should be addressed, in the first instance, to the Honorary Curator, WPIR, c/o Geographical and Life Sciences, Canterbury Christ Church University.

A brief history of Bingley Island

Bingley Island (East Kent, V.C. 15; UK National Grid Reference TR 142 576) is 184 m long east-west by up to 109 m wide north-south, with a total extent of 1.686 ha. This low-lying eyot is located between two branches of the Great Stour that separate about 1 km south-west of Westgate Towers. The two branches are connected by a deep cross-channel at the eastern end, to form a roughly trapezoidal island within the river system (Fig. 1). [Note: on Ordnance Survey maps the site is labelled Bingley's Island, now considered to be a misnomer.]

The underlying geology of the study area is alluvium – a mixture of clay, silt, sand and gravel (BGS, 2013). These superficial deposits overlie solid chalk (Seaford Chalk Formation). Stour Second Terrace gravels in the vicinity are also notable. Similar deposits downstream at Sturry (tending to lie at a higher contour) have produced very significant anthropogenic finds dating to Marine Isotope Stages 12–8 (*ca* 500,000–240,000 BP; Wenban-Smith, 2007: 47). The gravels were laid down in high energy conditions, but clearly produce significant

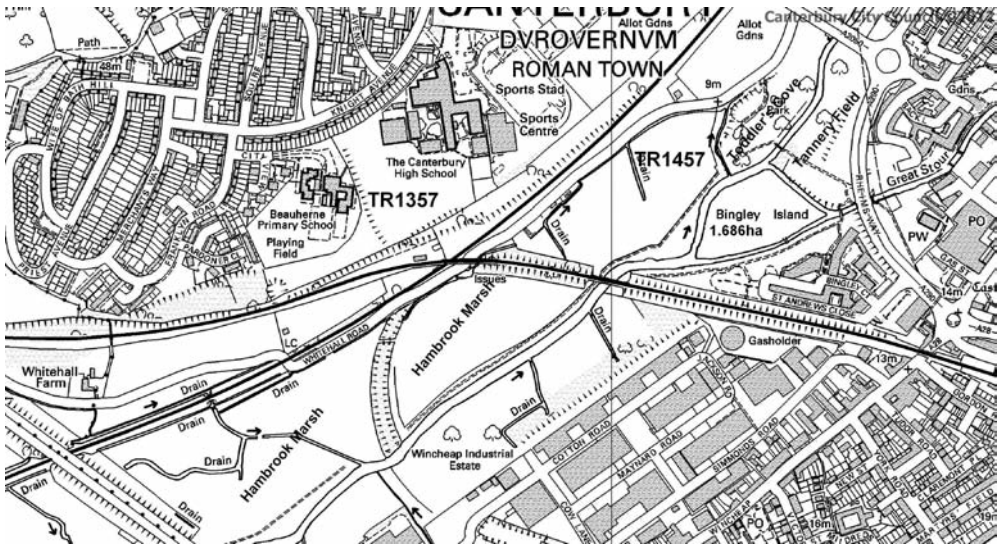


Fig. 1. Map of part of western Canterbury, showing location of Bingley Island in relation to Toddlers Cove, Tannery Field, Hambrook Marshes and Rheims Way (A290). Bingley Island is bounded by a branching of the Great Stour, and a small channel that connects them. Westgate Gardens end at the northern margin of the A2050 road bridge. [Note that the preferred area spellings are now Bingley Island and Toddlers Cove. This map, prepared by Rebecca Booth, Canterbury City Council, is based upon Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office © Crown copyright.]

Palaeolithic material along with faunal and floral data that can provide important contextual evidence of the palaeogeography and palaeoenvironment. Recent work at nearby Hallet's Garage, St Dunstan's, produced part of a fossilised elephant's tusk from Stour gravels.

Modern human occupation in the vicinity is evidenced from middle Neolithic pits (after *ca* 3500–3300 BC) at Whitehall Gardens, with sherds of Ebbsfleet pottery in shallow scoops or pits (Frere *et al.*, 1987: 45). These traces have been overshadowed by important remains of part of the late Iron Age forerunner of Canterbury in the same area, probably related to a crossing of the Great Stour; the settlement included buildings, pits, cremation burials, coinage etc. Recent work as part of the Westgate Parks project has revealed important new evidence of the industry on which such economies were based on Bingley Island itself. A geo-archaeological pilot study (Ruddy, 2012) has begun to trace the development of the island, perhaps already as a mid-river bar, in the later prehistoric/early historic period, and evidence of late Iron Age metal working and burning at this time have been identified at what may be the south-eastern extreme of the eyot. Alternatively, this activity marks the edge of the wide river channel, which latterly meandered southwards during a more widely evidenced flood event, sealing earlier deposits with layers of silt. It is likely that covering of the area in thick layers of silt and peat represents a process that began in the Roman period with the development of Canterbury, and the need for controlling river flow.

The original alignment of the main Roman road to London passes a short distance to the east of the island, and the St Dunstan's area was one of the main areas for Romano-British cremation and inhumation of the dead (Weekes, 2011), and for industry (e.g. pot and tile kilns). This area also saw the imposition of the town's mural defences including London Gate (Bennett *et al.*, 1982: 24ff); all such undertakings are likely to have made an impact on the palaeogeographic context and indeed ecology of Bingley Island, just up stream. The current suggestion is that prevention of flow may have brought about ponding-back as the Stour overflowed its channel to fill the flood plain; an established wetland marsh would quickly have developed in the waterlogged ground (Ruddy, 2012).

Human occupation of the island is likely to have remained broadly as sporadic as it is today, although some evidence of possible votive practice in Toddlers Cove should remind us that such a place may then have had a more religious and liminal significance. Throughout the Middle Ages and into the post-medieval and modern period this was part of the urban hinterland, no doubt managed for wood pasture, and more recently a focus for recreation, formalised as a Victorian swimming pool in Toddlers Cove. Although Bingley Island now forms part of a nature reserve, it is still subject to occasional transient occupation.

General ecology of Bingley Island

Bingley Island is part of the designated Whitehall Meadows and Bingley Island Local Nature Reserve. This statutory designation was made by the local authority in 1994. It is also part of the Great Stour Local Wildlife Site (LWS). LWSs are not statutory like Local Nature Reserves or SSSIs, but they have a selection procedure for their wildlife value. Local Authorities will take LWSs into account in planning decisions. Records for the various species noted in this section are deposited with Kentish Stour Countryside Partnership.

Through most of the 20th century the area upriver of Westgate Gardens and Toddlers Cove was floodplain meadows on rich alluvial soils. Bingley Island was probably grazed by cattle until the City Council acquired the land in 1970. Some planting of willows took place in 1972/1973 but during the 1980s and 1990s the island was largely left unmanaged. This resulted in dense stands of nettles with willow scrub at the western end, and several tall willow trees. Since *ca* 2000 the island has had paths mown through the nettles, and from 2005 one area has been mown several times a year, resulting in a grassy sward. The island floods every few years.

The Great Stour surrounds the island, with the main channel flowing on the north side. Of the five chalk rivers in Kent, the Great Stour is the longest and carries the greatest flow. Chalk rivers are a special habitat and have their own UK Biodiversity Action Plan. Rising from chalk geology, they are characterised by clear water, relatively stable flows and abundant wildlife. The Great Stour and its floodplain above Canterbury has seen many man-made changes over the centuries, such as straightening and deepening of the river, creation of new channels, maintenance of vegetation, gravel extraction in the floodplain, and infilling with inert material.

Using the Environment Agency Water Framework Directive four-grade scoring system of good, moderate, poor and bad, the main water body of the Great Stour, as it passes through Canterbury and onwards to Stourmouth (where the Stour originally entered the erstwhile Wantsum Channel), is currently classed as poor. This is mainly due to phosphates but also reflects habitat quality. Flows have been very low in a number of recent years, including March 2012, causing problems for some river wildlife, and deterioration of water quality.

The habitat of the river on the north side of Bingley Island is relatively good, with extensive emergent vegetation on a large meander. The other channels are narrower and deep, probably made so by human activity over many centuries. Kentish Stour Countryside Partnership (KSCP) carried out some in-channel works in autumn 2012 by securing woody debris to the banks, digging pools and depositing material to form shelves. KSCP will monitor the success of these works and would like to do more in future to encourage the natural processes of the river to operate, with expected improvements in riverbed gravels, banks, shelves and small cliffs.

The western most point of the island has willow scrub which has had some coppicing by KSCP volunteers since the 1990s, primarily to diversify the willow for a greater range of wildlife. With more labour a more consistent patch coppicing could take place, to help maintain a more diverse habitat. The island has some taller willow trees and a few alder. The mown grassy areas are currently fairly uninteresting from a biodiversity perspective. There was a pond next to the willow scrub of approximately 40 m², but this is now full of emergent vegetation.

Water crowfoot (*Ranunculus* spp.), water starwort (*Callitriche* spp.) and wild brown trout (*Salmo trutta* L.), characteristic of chalk rivers, are present. White clawed crayfish (*Austropotamobius pallipes* (Lereboullet)) were present upriver in Chartham in the 1990s but this species has not been recorded in the Canterbury District over the last ten years. Water vole (*Arvicola amphibius* (L.) (= *terrestris* L.)) were last recorded on this section of the river in 2004. An extensive search was carried out in 2012 by KSCP but water voles were not found. The last reliable evidence of otter (*Lutra lutra* (L.)) on this section of river was 2003.

Seven species of bat have been recorded over Westgate Parks since 2001, and these will all feed on insects over Bingley Island. A 2012 Kent Bat Group survey found good numbers of soprano pipistrelle (*Pipistrellus pygmaeus* (Leach)), common pipistrelle (*Pipistrellus pipistrellus* (Schreber)) and Daubenton's (*Myotis daubentonii* (Kuhl)). Grass snake and slow-worm are present. Breeding birds of note on the island include blackcap, chiff-chaff, reed bunting, reed warbler, sedge warbler, song thrush, common whitethroat and willow warbler. Kingfisher and grey wagtail are seen on the river.

Bingley Island, although small, when combined with the surrounding areas of the Great Stour, is an important urban nature reserve. It has a wide range of species and the potential, with appropriate management and improvements to river habitat and water quality, for more species to return to the site. However, its management for wildlife has to be balanced within its setting, on the very edge of Canterbury City.

Entomological surveys during July and August 2012

During the course of this survey, Bingley Island was visited on three occasions, 24 July 2012, 8 August 2012 and 22 August 2012, by Natural History Museum-associated groups including eight of the authors, Tristan Bantock, Max Barclay, Alex Greenslade, Peter Hammond, Daniel Osborne, Diana Percy, Dick Vane-Wright and Caroline Ware, assisted by personnel listed in the Acknowledgements. Although the focus was very much on the Coleoptera, TB and DP gathered a significant number of records for Hemiptera (included here as Appendix 1), and CW and DO made a preliminary survey of the flowering plants (Appendix 2).

Preliminary annotated check-list of Bingley Island beetles

Beetles are a popular indicator group, being diverse and relatively easy to collect and identify. The sampling strategy used on Bingley Island consisted of beating/sweeping vegetation, searching through leaf litter (mainly under *Salix* sp.), investigation of flowers, dung, dead wood and other available substrates, and pitfall trapping. Pitfall traps were set in two 5-metre transects, one in an area of dense *Salix*, termed 'woodland' and the other in long, rough grass termed 'grassland'. Traps were set in pairs two metres apart, at 1-metre intervals, so that each transect comprised 10 traps (total 20 traps on the island). Traps were disposable plastic cups of approximately 8 cm depth and 7 cm diameter (at opening), filled to a level of approximately 2.5 cm with a mixture of detergent, water and disinfectant, and were left in place for approximately two weeks. The traps were set on 24 July, emptied on the 8 of August, and then reset for another 2-week cycle, being collected again and taken up on the 22 August. During the sampling period three traps were lost in the woodland area during the first 2-week cycle, and two during the second. All traps were recovered in the grassland area on both sampling cycles.

The list below gives all beetle species collected, by all methods. {1} indicates species found on or among vegetation, {2} found in litter (mostly under willow), {3} found by pitfall trapping in 'grassland', and {4} found by pitfall trapping among dense willows ('woodland'). The taxonomic classification used follows Duff (2012), except that species are listed in alphabetical order within families.

Common names for families have been given where these are in general use. 'Local', 'Common' etc. indicate National Status, taken from Ball (1995) except statuses placed in parentheses, which have been provided or updated by the present authors for species recently added to the British list (e.g. the harlequin ladybird *Harmonia axyridis* (Pallas)), for species where Ball (1995) gave no status, or where the status that he gave has become out of date due to very significant changes in distribution and abundance in the 17 years since the review (e.g. the flea beetles *Aphthona euphorbiae* (Schrank) and *Longitarsus parvulus* (Paykull) have gone from scarce to extremely common). Voucher specimens for almost all records have been deposited in the WPIR beetle collection, Canterbury Christ Church University.

Carabidae – Ground Beetles

<i>Agonum emarginatum</i> (Gyllenhal)	Local	{3}
<i>Agonum thoreyi</i> Dejean	Local	{3}
<i>Amara aenea</i> (Degeer)	Common	{1}
<i>Amara communis</i> (Panzer)	Local	{3}
<i>Amara convexior</i> Stephens	Local	{3}
<i>Amara plebeja</i> (Gyllenhal)	Common	{3}
<i>Anisodactylus binotatus</i> (Fabricius)	Local	{3}
<i>Bembidion biguttatum</i> (Fabricius)	Common	{2}
<i>Bembidion properans</i> (Stephens)	Common	{1} {3}
<i>Curtonotus aulicus</i> (Panzer)	Common	{1} {3} {4}
<i>Loricera pilicornis</i> (Fabricius)	Common	{3} {4}
<i>Nebria brevicollis</i> (Fabricius)	Common	{1}
<i>Notiophilus biguttatus</i> (Fabricius)	Common	{1}
<i>Ocys harpaloides</i> (Audinet-Serville)	Common	{1} {2}
<i>Ophonus rufibarbis</i> (Fabricius)	Common	{3} {4}
<i>Paradromius linearis</i> (Olivier)	Common	{1}
<i>Poecilus cupreus</i> (Linnaeus)	Local	{3}
<i>Pterostichus madidus</i> (Fabricius)	Common	{3}
<i>Pterostichus niger</i> (Schaller)	Common	{4}
<i>Pterostichus strenuus</i> (Panzer)	Common	{3} {4}
<i>Stomis pumicatus</i> (Panzer)	Local	{3}
<i>Trechus quadristriatus</i> (Schrank)	Common	{3}

Hydrophilidae – Water Beetles

<i>Megasternum concinnum</i> (Marsham) (s.l.)	Common	{3} {4}
<i>Cercyon</i> sp. 1		{3}
<i>Cercyon</i> sp. 2		{3}

Ptiliidae – Feather Winged Beetles

<i>Acrotichis atomaria</i> (Degeer)	Common	{3}
<i>Ptenidium pusillum</i> (Gyllenhal)	Common	{3}

Leiodidae – Fungus and Carrion Beetles

<i>Agathidium varians</i> Beck	Common	{2}
<i>Catops fuliginosus</i> Erichson	Common	{3}
<i>Colenis immunda</i> (Sturm)	Local	{4}
<i>Ptomaphagus subvillosus</i> (Goeze)	Common	{4}
<i>Ptomaphagus varicornis</i> (Rosenhauer)	RDBk	{3}
<i>Sciodrepoides watsoni</i> (Spence)	Common	{4}

Silphidae – Carrion Beetles

<i>Silpha atrata</i> Linnaeus	Common	under bark
<i>Silpha tristis</i> Illiger	Local	{3}

Staphylinidae – Rove Beetles

<i>Aleochara brevipennis</i> Gravenhorst	Notable B	{3}
<i>Aleochara curtula</i> (Goeze)	Common	{3}
<i>Aloconota gregaria</i> (Erichson)	Common	{3/4?}
<i>Anotylus hamatus</i> (Fairmaire & Laboulbène)	Notable B	{1} {3}
<i>Anotylus rugosus</i> (Fabricius)	Common	{3} {4}
<i>Atheta britanniae</i> (Bernhauer & Scheerpeltz)	[Local]	{4}
<i>Atheta castanoptera</i> (Mannerheim)	Common	{4}
<i>Atheta vaga</i> (Heer)	Local	{4}
<i>Atheta triangulum</i> (Kraatz)	Common	{4}
<i>Bisnius fimetarius</i> (Gravenhorst)	Common	{4}
<i>Bisnius sordidus</i> (Gravenhorst)	Common	{3}
<i>Carpelimus elongatulus</i> (Erichson)	Common	{2}
<i>Cordalia obscura</i> (Gravenhorst)	[Local]	{3/4?}
<i>Dinaraea aequata</i> (Erichson)	Common	{4}
<i>Dinaraea angustula</i> (Gyllenhal)	Local	{4}
<i>Drusilla canaliculata</i> (Fabricius)	Common	{3} {4}
<i>Eusphalerum luteum</i> (Marsham)	Common	{1} {4}
<i>Falagrioma thoracica</i> (Stephens)	Local	{3/4?}
<i>Geostiba circellaris</i> (Gravenhorst)	Common	{3/4?}
<i>Gyrophaena</i> sp.		{4}
<i>Ilyobates</i> sp.		{3}
<i>Ischnosoma splendidum</i> (Gravenhorst)	Common	{3}
<i>Lathrobium brunnipes</i> (Fabricius)	Common	{2}
<i>Lathrobium fulvipenne</i> (Gravenhorst)	Common	{3}
<i>Lathrobium geminum</i> Kraatz	Common	{2}
<i>Lesteva sicula</i> Erichson	Common	{2}
<i>Megarthus denticollis</i> (Beck)	Common	{3}
<i>Megarthus depressus</i> (Paykull)	Common	{3}
<i>Mocyta fungi</i> (Gravenhorst)	Common	{2} {4}
<i>Mocyta orbata</i> (Erichson)	[Local]	{2}
<i>Mycetota laticollis</i> (Stephens)	Common	{3}
<i>Ocypus brunnipes</i> (Fabricius)	Common	{4}
<i>Omalium rivulare</i> (Paykull)	Common	{2}
<i>Philonthus addendus</i> Sharp	Local	{3}
<i>Philonthus carbonarius</i> (Gravenhorst)	Common	{3}
<i>Philonthus cognatus</i> Stephens	Common	{1} {3}
<i>Philonthus concinnus</i> (Gravenhorst)	[Local]	{3}
<i>Philonthus decorus</i> (Gravenhorst)	Common	{3}
<i>Philonthus jurgans</i> Tottenham	[Common]	{3}
<i>Philonthus laminatus</i> (Creutzer)	Common	{3} {4}
<i>Philonthus marginatus</i> (Müller)	Common	{3}
<i>Philonthus succicola</i> Thomson	Local	{3} {4}
<i>Philonthus tenuicornis</i> Mulsant & Rey	Local	{3}
<i>Philonthus varians</i> (Paykull)	Common	{3}
<i>Platydracus stercorarius</i> (Olivier)	Local	{3}
<i>Quedius curtipennis</i> Bernhauer	Common	{3} {4}
<i>Quedius fuliginosus</i> (Gravenhorst)	Common	{3} {4}
<i>Quedius molochinus</i> (Gravenhorst)	Common	{3}
<i>Rugilus erichsoni</i> (Fauvel)	Common	{3}
<i>Rugilus orbiculatus</i> (Paykull)	Common	{3}

<i>Staphylinus dimidiaticornis</i> Gemminger	Local	{3}
<i>Stenus clavicornis</i> (Scopoli)	Common	{3}
<i>Tachinus laticollis</i> Gravenhorst	Local	{1} {3}
<i>Tachinus rufipes</i> (Linnaeus)	Common	{1} {3} {4}
<i>Tachyporus dispar</i> (Paykull)	Common	{1} {3}
<i>Tachyporus hypnorum</i> (Fabricius)	Common	{3} {4}
<i>Tachyporus nitidulus</i> (Fabricius)	Common	{3} {4}
<i>Tachyporus obtusus</i> (Linnaeus)	Common	{1} {3}
<i>Tachyporus solutus</i> Erichson	Common	{1}
<i>Tasgius melanarius</i> (Heer)	[Common]	{3}
<i>Tasgius morsitans</i> (Rossi)	Local	{3} {4}
<i>Xantholinus longiventris</i> Heer	Common	{2}
Lucanidae – Stag Beetles		
<i>Dorcus parallelipedus</i> (Linnaeus)	Local	{3}
Scarabaeidae – Dung Beetles and Chafers		
<i>Aphodius erraticus</i> (Linnaeus)	Common	in dung
Throscidae		
<i>Trixagus carinifrons</i> (Bonvouloir)	Local	{1}
Elateridae – Click Beetles		
<i>Adrastus pallens</i> (Fabricius)	Common	{1} {4}
<i>Agriotes obscurus</i> (Linnaeus)	Common	{3}
Cantharidae – Soldier Beetles		
<i>Malthodes minimus</i> (Linnaeus)	Common	{1}
<i>Rhagonycha fulva</i> (Scopoli)	Common	{1} {3}
Kateretidae		
<i>Brachypterus glaber</i> (Newman)	Common	{1}
<i>Brachypterus urticae</i> (Fabricius)	Common	{1}
Nitidulidae – Pollen Beetles		
<i>Meligethes aeneus</i> (Fabricius)	Common	{1}
<i>Meligethes morosus</i> Erichson	Local	{1}
<i>Meligethes nigrescens</i> Stephens	Common	{1}
<i>Meligethes ruficornis</i> (Marsham)	Local	{1}
Phalacridae – Smut Beetles		
<i>Stilbus testaceus</i> (Panzer)	Common	{1}
Cryptophagidae		
<i>Atomaria fuscata</i> (Schönherr)	Common	{3}
<i>Atomaria rubella</i> Heer	Common	{3} {4}
<i>Cryptophagus setulosus</i> Sturm	Common	{4}
<i>Ephistemus globulus</i> (Paykull)	Common	{1}
Coccinellidae – Ladybirds		
<i>Coccinella septempunctata</i> Linnaeus	Common	{1}

<i>Harmonia axyridis</i> (Pallas)	[Common]	{1}
<i>Propylea quattuordecimpunctata</i> (Linnaeus)	Common	{1}
<i>Psyllobora vigintiduopunctata</i> (Linnaeus)	Common	{1}
<i>Rhyzobius litura</i> (Fabricius)	Common	{3}
<i>Scymnus haemorrhoidalis</i> Herbst	Common	{3}
<i>Tytthaspis sedecimpunctata</i> (Linnaeus)	Local	{3}

Corylophidae

<i>Corylophus cassidoides</i> (Marsham)	Local	{1}
<i>Orthoperus nigrescens</i> Stephens	[Local to Common]	{2}

Latridiidae

<i>Cartodere bifasciata</i> (Reitter)	Common	{4}
<i>Corticicara gibbosa</i> (Herbst)	Common	{1}

Oedemeridae – Flower Beetles

<i>Oedemera nobilis</i> (Scopoli)	Common	{1} {3}
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Cerambycidae – Longhorn Beetles

<i>Leptura quadrifasciata</i> Linnaeus	Local	{1}
<i>Pogonocherus hispidus</i> (Linnaeus)	Local	{1}
<i>Rutpela maculata</i> (Poda)	Common	{1}

Chrysomelidae – Leaf Beetles

<i>Aphthona euphorbiae</i> (Schrank)	[Common]	{1} {4}
<i>Chaetocnema hortensis</i> (Fourcroy)	Common	{3}
<i>Crepidodera aurata</i> (Marsham)	Common	{1}
<i>Crepidodera fulvicornis</i> (Fabricius)	Common	{1}
<i>Crepidodera plutus</i> (Latreille)	Local	{1}
<i>Longitarsus ballotae</i> (Marsham)	Notable B	{1}
<i>Longitarsus luridus</i> (Scopoli)	Common	{1} {3}
<i>Longitarsus parvulus</i> (Paykull)	[Common]	{1} {3} {4}
<i>Longitarsus rubiginosus</i> (Foudras)	Local	{1} {3}
<i>Neocrepidodera transversa</i> (Marsham)	Common	{3}
<i>Oulema rufocyanea</i> (Suffrian)	[Common]	{1}
<i>Phaedon tumidulus</i> (Germar)	Common	{1}
<i>Podagrica fuscicornis</i> (Linnaeus)	Notable B	{1}
<i>Psylliodes affinis</i> (Paykull)	Common	{1} {4}
<i>Psylliodes chrysocephala</i> (Linnaeus)	Local	{1}
<i>Psylliodes picina</i> (Marsham)	Local	{1} {3}
<i>Sphaeroderma testaceum</i> (Fabricius)	Common	{1} {3}

Apionidae – Seed Weevils

<i>Apion frumentarium</i> (Linnaeus)	Common	{1}
<i>Aspidapion aeneum</i> (Fabricius)	Local	{1}
<i>Aspidapion radiolus</i> (Marsham)	Common	{1}
<i>Ceratapion onopordi</i> (Kirby)	Common	{1}
<i>Malvapion malvae</i> (Fabricius)	Common	{1}
<i>Perapion hydrolapathi</i> (Marsham)	Common	{1}
<i>Pseudapion rufirostre</i> (Fabricius)	Common	{1}

Nanophyidae

<i>Nanophyes marmoratus</i> (Goeze)	Common	{1}
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Curculionidae – True Weevils

<i>Archarius salicivorus</i> (Paykull)	Common	{1}
<i>Barypeithes pellucidus</i> (Boheman)	Common	{3}
<i>Ceutorhynchus obstructus</i> (Marsham)	Common	{1}
<i>Nedys quadrimaculatus</i> (Linnaeus)	Common	{1} {3}
<i>Sitona lineatus</i> (Linnaeus)	Common	{1} {3}
<i>Sitona lepidus</i> Gyllenhal	Common	{3}

Discussion

During his visit on 22 August 2012, Peter Hammond (PMH) observed that the island topsoil was extremely dry, which made beetle collecting very difficult. According to PMH, the island should support something in the order of 300–400 beetle species. To date, as listed above, a total of 161 beetle species belonging to 24 families has been recorded. In relation to PMH's estimate this is a respectable number, given that the site was visited on only three occasions, and a limited range of collecting techniques was employed. Moreover, sampling began late in the year, after the spring and early summer peak of adult beetle abundance and diversity.

Of the 161 species, 115 (71%) are categorised as 'Common' and 37 (23%) as 'Local'. Of the remainder, a few have not been identified beyond genus, and the remaining five have a formal conservation status. Of these, four are listed as the lowest category, 'Nationally Scarce B' (Notable B), indicating that they are known from fewer than 100 10-km squares of the National Grid (Hyman, 1992), these being the rove beetles *Anotylus hamatus* (Fairmaire & Laboulbène) and *Aleochara brevipennis* Gravenhorst, and the leaf beetles *Podagrira fuscicornis* (L.) and *Longitarsus ballotae* (Marsham).

The final species, *Ptomaphagus varicornis* (Rosenhauer) (Fig. 2) is small (*ca* 3.5 mm in body length, ranging from 2.7–4.1 mm) and rarely collected. It is given 'Red Data Book: Insufficiently Known' (RDBK) status by Hyman (1994), who noted pre-1970 records from just eight English vice-counties including East Kent (V.C. 15), and only one post-1970 record, from Surrey. Moreover, Denton (2005), in his review of the Surrey beetle fauna, was unable to trace this last record and regarded it as questionable.

However, there must be doubt as to whether the relative paucity of available records reflects its true status in Britain. We know of four published post-1970 records for English localities: one in Somerset (Duff, 1993), and three in Wiltshire (Darby, 2009; Telfer, 2013); there are also previously unpublished records for Drayton Copse, near Abingdon, Oxfordshire (old Watsonian vice-county of Berkshire), where *P. varicornis* was present in pitfall trap samples for June 2006, and later the same year in large area flight interception trap samples for August (P. M. Hammond, unpublished).

Hyman (1994) noted that *P. varicornis* is 'usually found in leaf litter and moss; adults have been found in April and May'. Although the habits and favoured habitats of *P. varicornis* remain poorly understood, it is probably a scavenger and (like many other Ptomaphagini) may well be associated with underground habitats such as small mammal runs and/or nests. This is consistent with an unusually large number of shrews (presumably Common Shrew *Sorex araneus* L.) observed during sampling on the island. Most recent specimens of *P. varicornis* are from trap samples rather than having been individually collected, suggestive

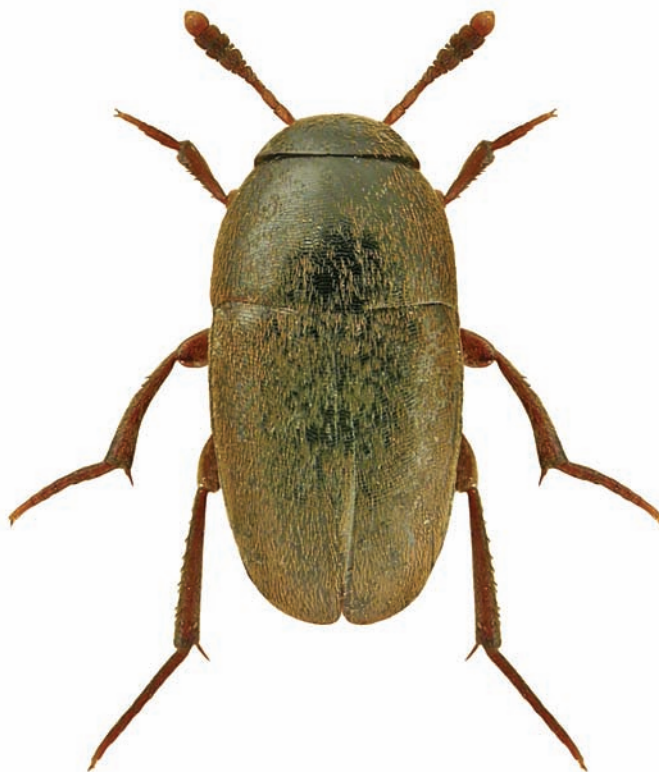


Fig. 2. *Ptomaphagus varicornis* (Rosenhauer, 1847). Polish specimen.

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that activity above ground may largely be nocturnal. Most records are also from locations with chalky or otherwise basic soils. These characteristics, coupled with its small size and similarity to other *Ptomaphagus* species that are of commoner occurrence in Britain, are consistent with a view that *P. varicornis* may be more overlooked than exceptionally scarce. Even so, this is a notable record.

At Bingley, a total of 22 specimens of *P. varicornis* was collected in pitfall traps in both the 'grassland' and 'woodland' habitats, during both trapping periods (24 July–8 August, and 8–22 August). Together with PMH's unpublished data and the Wiltshire records, this confirms that adult activity for this species extends from April at least into October. This is also the first post-1970 record for East Kent. We could not find any other published records of the species being found in numbers in the U.K.

The Hemiptera recorded (Appendix I) also included one species of particular interest, the cydnid *Tritomegas sexmaculatus* (Rambur). This is only the third British record of this new arrival, which was first found in 2011 at two sites in Kent, following recent range expansion on the continent (Botting & Bantock, 2012). It is considered likely to spread quickly and has since been recorded on the edge of the London area in Dartford. This bug is one of several invertebrate species found at Bingley Island on stands of black horehound, *Ballota nigra* L. In

addition to *T. sexmaculatus*, the plant bug *Macrotylus horvathi* Reuter and the leaf beetle *Longitarsus ballotae* are also associated with this food plant.

Amongst the flowering plants (Appendix II) the most interesting is slender thistle *Carduus tenuiflorus* Curtis. This was abundant amongst the vegetation along the river margins. Typically found along the coast on seawalls and rough grassland, it does occur inland occasionally (Philp, 2010). KMBRC (2013) report 22 records within a 10-km radius of Bingley Island, all of which are coastal locations apart from two inland records, of which Stodmarsh is the nearest. This is the first record of *Carduus tenuiflorus* on Bingley Island.

Although the dense nettle stands are botanically uninteresting, common nettle *Urtica dioica* L. supports a diversity of insects. It is the sole host-plant for several common species of Coleoptera and Hemiptera, such as the beetles *Brachypterus urticae* (Fabricius) and *Nedyus quadrimaculatus* (L.), as well as the ground bug *Heterogaster urticae* (Fabricius) and the leafhopper *Eupteryx urticae* (Fabricius) (Davis, 1991). Not surprisingly, all of these species were found amongst nettles during this survey.

With respect to the current and future status of the island, if the priority is to maximize its value as a nature reserve, it would clearly benefit from substantial active management, including new habitat creation. However, just what any such management might be depends very much on the plans of the Kentish Stour Countryside Partnership, Canterbury City Council's Westgate Parks project, and the Environment Agency's future plans for the Great Stour itself – especially upstream from Canterbury. With respect to the Coleoptera, we hope that the research reported here, together with further fieldwork proposed by WPIR for the next five years, including more work on beetles, will offer an empirical basis for addressing the needs and opportunities for insect conservation and habitat enhancement on this important stretch of the Great Stour.

Acknowledgements

The introductory sections were drafted by RIVW, DP and ICF. The sections on history of Bingley Island and general ecology are based on drafts by JW and JS (respectively). The Coleoptera were identified by AFCG, MVLB, PMH and RGB. The discussion was largely written by MVLB, PMH, RIVW, TMB and CW. Appendix I was prepared by TB and DP. Appendix II was prepared by CW and DO.

The authors thank the team of volunteers that made a substantial contribution to sampling efforts during the three 2012 visits to Bingley Island: Nicholas and Catherine Barclay, Natalie Dale-Skey, Emeline Favreau, Martin Honey, Alexander Kazhdan, Magnus Rowbotham, Alexander Sadek and Adam Sharp. We also acknowledge Richard Griffiths, Rebecca Booth and Annabelle Pennell (Canterbury City Council), Tom Reid (Environment Agency), Jon Linnane (Friends of Westgate Parks), Mark Spencer, Adrian Rundle and Laurence Clemons, as well as Andrew Richens and Jessica Bentley who assisted Alex Greenslade in preparing the beetle voucher collection, Beulah Garner who assisted with several identifications, and Lech Borowiec (University of Wrocław) who kindly gave permission to reproduce his image of *Ptomaphagus varicornis*. Travel expenses for volunteers and others undertaking the entomological and plant surveys on Bingley Island were funded by the Heritage Lottery Fund

(Westgate Parks project start-up grant to Canterbury City Council). We are also grateful to two anonymous reviewers for helpful comments.

On 2 July 2013, Heritage Lottery Fund announced that Westgate Gardens and Landscape, Canterbury, had been awarded £766,800 in support of the proposed scheme.

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Appendix I**Preliminary checklist of Bingley Island Hemiptera****Psyllidae**

Trioza urticae (Linnaeus)
Psylla foersteri Flor
Psylla alni (Linnaeus)
Bactericera albiventris (Förster)

Anthocoridae

Anthocoris nemoralis (Fabricius)
Anthocoris nemorum (Linnaeus)
Orius vicinus (Ribaut)

Aphrophoridae

Aphrophora alni (Fallén)
Philaenus spumarius (Linnaeus)
Neophilaenus lineatus (Linnaeus)

Cicadellidae

Agallia consobrina Curtis
Aphrodes makarovi Zakhvatkin
Deltocephalus pulicaris (Fallén)
Psammotettix confinis (Fallén)
Macrosteles sexnotatus (Dahlbom)
Alebra wahlbergi (Boheman)
Eupteryx aurata (Linnaeus)
Eupteryx florida Ribaut
Eupteryx urticae (Fabricius)
Ribautiana ulmi (Linnaeus)
Zygmidia scutellaris (Herrich-Schäffer)

Coreidae

Coreus marginatus (Linnaeus) [Also noted on 23rd September 2012 by CW, on *Rumex obtusifolius*]

Cydnidae

Tritomegas sexmaculatus (Rambur)
Tritomegas bicolor (Linnaeus)

Delphacidae

Dicranotropis hamata (Boheman)
Javesella pellucida (Fabricius)

Lygaeidae

Heterogaster urticae (Fabricius)

Miridae

Dicyphus epilobii Reuter
Deraeocoris ruber (Linnaeus)
Liocoris tripustulatus (Fabricius)
Lygocoris pabulinus (Linnaeus)
Lygus pratensis (Linnaeus)
Orthops basalis (A. Costa)
Orthops campestris (Linnaeus)
Notostira elongata (Geoffroy)
Stenodema laevigata (Linnaeus)
Halticus luteicollis (Panzer)
Heterotoma planicornis (Pallas)
Macrotylus horvathi Reuter
Orthonotus rufifrons (Fallén)
Plagiognathus arbustorum (Fabricius)

Nabidae

Himacerus mirmicoides (O. Costa)
Nabis limbatus Dahlbom

Pentatomidae

Palomena prasina (Linnaeus)

Appendix II**Preliminary checklist of Bingley Island flowering plants, by habitat****Species****Common name****Marginals (river banks and margins)**

<i>Agrostis stolonifera</i> L.	Creeping Bent
<i>Anisantha diandra</i> (Roth) Tutin ex Tzvelev	Great Brome
<i>Anthriscus sylvestris</i> (L.) Hoffm.	Cow Parsley
<i>Ballota nigra</i> L.	Black Horehound
<i>Calystegia sepium</i> (L.) R. Br.	Hedge Bindweed
<i>Carduus tenuiflorus</i> * Curtis	Slender Thistle
<i>Cirsium arvense</i> (L.) Scop.	Creeping Thistle
<i>Convolvulus arvensis</i> L.	Field Bindweed
<i>Dactylis glomerata</i> L.	Cock's-foot
<i>Elytrigia repens</i> (L.) Desv. Ex Nevski	Common Couch
<i>Epilobium hirsutum</i> L.	Great Willowherb
<i>Ficaria verna</i> Huds.	Lesser Celandine
<i>Fraxinus excelsior</i> L.	Ash
<i>Galanthus nivalis</i> L.	Snowdrop
<i>Galium aparine</i> L.	Cleavers
<i>Glyceria maxima</i> (Hartm.) Holmb.	Reed Sweet-grass
<i>Hedera helix</i> L.	Common Ivy
<i>Helminthotheca echioides</i> (L.) Holub	Bristly Oxtongue
<i>Heracleum sphondylium</i> L.	Hogweed
<i>Hordeum murinum</i> L.	Wall Barley
<i>Lythrum salicaria</i> L.	Purple-loosestrife
<i>Malva sylvestris</i> L.	Common Mallow
<i>Oenanthe crocata</i> L.	Hemlock Water-dropwort
<i>Phalaris arundinacea</i> L.	Reed Canary-grass
<i>Phragmites australis</i> (Cav.) Trin. ex Steud.	Common Reed
<i>Plantago major</i> L.	Greater Plantain
<i>Prunus spinosa</i> L.	Blackthorn
<i>Ranunculus repens</i> L.	Creeping buttercup
<i>Rubus fruticosus</i> L. agg.	Bramble agg.
<i>Rumex obtusifolius</i> L.	Broad-leaved Dock
<i>Sambucus nigra</i> L.	Elder
<i>Solanum dulcamara</i> L.	Bittersweet
<i>Sonchus asper</i> (L.) Hill	Prickly Sow-thistle
<i>Taraxacum officinale</i> agg.	Dandelion agg.
<i>Urtica dioica</i> L.	Common Nettle

Central grassland area (recently cut)

<i>Angelica sylvestris</i> L.	Wild Angelica
<i>Anisantha sterilis</i> (L.) Nevski	Barren Brome
<i>Anthriscus sylvestris</i> (L.) Hoffm.	Cow Parsley
<i>Arctium minus</i> (Hill) Bernh.	Lesser Burdock
<i>Bellis perennis</i> L.	Daisy
<i>Capsella bursa-pastoris</i> (L.) Medik.	Shepherd's-purse
<i>Cerastium fontanum</i> Baumg.	Common Mouse-ear
<i>Glechoma hederacea</i> L.	Ground-ivy
<i>Helminthotheca echioides</i> (L.) Holub	Bristly Oxtongue
<i>Holcus lanatus</i> L.	Yorkshire-fog
<i>Lamium album</i> L.	White Dead-nettle
<i>Lamium purpureum</i> L.	Red Dead-nettle
<i>Lolium perenne</i> L.	Perennial Rye-grass
<i>Picris hieracioides</i> L.	Hawkweed Oxtongue

<i>Poa annua</i> L.	Annual Meadow-grass
<i>Poa trivialis</i> L.	Rough Meadow-grass
<i>Pulicaria dysenterica</i> (L.) Bernh.	Common Fleabane
<i>Ranunculus acris</i> L.	Meadow Buttercup
<i>Rumex acetosa</i> L.	Common Sorrel
<i>Rumex obtusifolius</i> L.	Broad-leaved Dock
<i>Solanum</i> sp (seedling)	Nightshade seedling
<i>Sonchus arvensis</i> L.	Perennial Sow-thistle
<i>Sonchus asper</i> (L.) Hill	Prickly Sow-thistle
<i>Trifolium repens</i> L.	White Clover

Scrub

<i>Alliaria petiolata</i> (M.Bieb.) Cavara & Grande	Garlic Mustard
<i>Alnus glutinosa</i> (L.) Gaertn.	Alder
<i>Anthriscus sylvestris</i> L.Hoffm.	Cow Parsley
<i>Carex pendula</i> Huds.	Pendulous Sedge
<i>Crataegus monogyna</i> Jacq.	Hawthorn
<i>Ficaria verna</i> Huds.	Lesser Celandine
<i>Filipendula ulmaria</i> (L.) Maxim.	Meadowsweet
<i>Galanthus nivalis</i> L.	Snowdrop
<i>Geum urbanum</i> L.	Wood Avens
<i>Hedera helix</i> L.	Common Ivy
<i>Salix alba</i> L.	White Willow
<i>Sambucus nigra</i> L.	Elder
<i>Stachys sylvatica</i> L.	Hedge Woundwort
<i>Taxus baccata</i> L.	Yew
<i>Urtica dioica</i> L.	Common Nettle

Additional species in area from drover's bridge to new houses at Bingley Court

<i>Arrhenatherum elatius</i> (L.) P.Beauv. ex J. & C. Presl	False Oat-grass
<i>Cynosurus cristatus</i> L.	Crested Dog's-tail
<i>Geranium robertianum</i> L.	Herb-Robert
<i>Medicago lupulina</i> L.	Black Medick
<i>Sisymbrium officinale</i> (L.) Scop.	Hedge Mustard

Salix species throughout

<i>Salix alba</i> * L.	White Willow
<i>Salix caprea</i> L.	Goat Willow
<i>Salix fragilis</i> * L.	Crack-willow
<i>Salix x reichardtii</i> * A.Kern.	

* determined by Mark Spencer. Nomenclature follows Stace (2010).