

Hymettus

Hymettus Ltd Research Report for 2012

Compiled by Paul Lee



**Lea-Side, Carron Lane, MIDHURST, West Sussex GU29 9LB
Registered in England No. 5761114
Registered Charity No. 1124636**

Cover photograph:
Ammophila pubescens by Steven Falk

CONTENTS

| | |
|--|----|
| Hymettus Research Report for 2012 | 1 |
| 1. Background to 2012 research | 1 |
| 2. Shingle & sand dune invertebrates | 1 |
| 2.1 <i>Doratura impudica</i> | 1 |
| 3. Invertebrates of the North Sea and English Channel coasts | 1 |
| 3.1 <i>Trachysphaera lobata</i> | 1 |
| 3.2 <i>Nothogeophilus turki</i> | 2 |
| 4. Invertebrates of heathland | 4 |
| 5. Invertebrates of flower-rich grassland | 4 |
| 5.1 <i>Andrena marginata</i> in Scotland | 4 |
| 5.2 Great Yellow Bumblebee <i>Bombus distinguendus</i> | 5 |
| 5.3 Short-haired Bumblebee <i>Bombus subterraneus</i> | 5 |
| 6. Invertebrates of East Anglian wetlands | 6 |
| 6.1 <i>Odynerus simillimus</i> | 6 |
| 6.2 <i>Rhopalum gracile</i> and <i>Passaloecus clypealis</i> | 7 |
| 6.3 <i>Lipara similis</i> | 7 |
| 7. Invertebrates of open woodland | 8 |
| 7.1 <i>Neoempheria lineola</i> | 8 |
| 8. Development of Hymettus Ltd. | 10 |

Hymettus Research Report for 2012

1. Background to 2012 research

1.1 This report deals with the research programme originating in discussions of the Steering Group at the 2011 Hymettus Annual Review meeting and finalised by the coordinator with advice from the Hymettus Board of Trustees. The reported work was made possible by grants from Defra, from Natural England, from the Redwing Trust and from Scottish Natural Heritage. Much of the work is only summarised here but further details can be obtained from Paul Lee and reports of many individual projects can be downloaded from the Hymettus website.

1.2 The UK Biodiversity Action Plan (UK BAP) is the UK Government's response to the international Convention on Biodiversity signed in 1992. It should provide a detailed set of plans for conservation of the 1150 Priority Species and 65 Priority Habitats listed therein but gaps in knowledge, particularly for the less well known species groups, have proved a barrier to the completion and delivery of these plans. 2012 was the final field season for a small number of projects yet to be completed under the Defra funded initiative begun in 2010. This aimed to address some of the knowledge gaps that have been independently identified as priority areas of investigation for BAP Priority Species of lesser-known terrestrial invertebrates. In addition to aculeate hymenoptera, these BAP Priority Species included three millipedes, a centipede, four flies, ten ground beetles and a leaf hopper.

1.3 The Species Action Framework project on *Bombus distinguendus* in Scotland came to an end in 2012 also but work continued in partnership with Natural England, Bumblebee Conservation Trust and RSPB on the reintroduction of *Bombus subterraneus* in England.

2. Shingle & sand dune invertebrates

2.1 *Doratura impudica*

Dr Alan Stewart was funded to continue his work on this species in 2012. He was to use the knowledge gained of its preferred habitat during the Defra funded project to survey for *D. impudica* in two large sand dune systems in the south-west (Studland and Braunton Burrows) and three in south Wales (Kenfig, Merthyr Mawr and Whitford Burrows). Unfortunately he was unable to complete the work in 2012 due to an injury and the survey has been postponed until 2013.

3. Invertebrates of the North Sea and English Channel coasts

3.1 *Trachysphaera lobata*

Steve Gregory, Paul Lee and Dr Helen Read visited the Isle of Wight again in May 2012 to search for the centipede *Nothogeophilus turki* and took the opportunity to check on the population of the pill millipede *Trachysphaera lobata* at East Cliff, Bembridge. When the

millipede was first discovered here in 1984 the population density was estimated at 5600 individuals m^{-3} of soil. A survey of the area in 2005 found that the millipede inhabited a longer stretch of the undercliff than originally noted but estimated the population density at between 2377 and 3133 individuals m^{-3} of soil. The estimated population density in 2012 was just 1083 individuals m^{-3} of soil. This apparent decline is very worrying if it is real but the influence of extraneous factors including vertical movements of millipedes within the soil profile is unknown. There had been significant management of the site since the visit in 2011 with the construction of a boardwalk through the area. This was thought unlikely to be the cause of any decline and may protect the habitat long term by reducing soil disturbance away from the route of the boardwalk. Although other potential habitat at Centurions Copse and Colwell Bay was checked no other populations of *T. lobata* were located.

3.2 *Nothogeophilus turki*

Steve Gregory, Paul Lee and Dr Helen Read visited the Isle of Wight again in 2012 to search for the centipede *Nothogeophilus turki*. Fieldwork was undertaken over three days in May and as in 2011 several coastal sites were visited as a long stretch of coast could conceivably be described as being part of Freshwater and its environs but again the centipede could not be found. The banks of the River Medina at Newport where the species was supposedly found were also visited but this area seemed most unlikely to have ever supported the species. A final search at Fort Victoria Country Park was fruitless also. It is highly probable that the species no longer survives on the Isle of Wight, at least in the Freshwater area. However, a re-survey of sites on the Isles of Scilly are still required at some time in the near future.

3.3 Wallasea Island salt marshes

Following on from the desk study completed in 2011, Hymettus was approached by NE to undertake field surveys comparing the invertebrate communities of upper saltmarsh – brackish grassland transition at a number of sites in Essex. Delays in starting the work due to the poor weather, a change of project officer at Natural England and difficulties of site access resulted in the field survey being targeted at the terrestrial invertebrates of three adjacent areas of saltmarsh at Wallasea Island in Essex. In common with many of the east coast saltmarshes, the development of the upper saltmarsh – brackish grassland transition at Wallasea was curtailed by a sea wall. Therefore the primary objective of the study was altered to that of obtaining data on the invertebrate assemblages of a long-established intertidal area and two recently created realignment areas.

During a site meeting at Wallasea Island with the Natural England project officer three areas of saltmarsh were selected for survey, two realigned areas and an older, established area to the North. The three areas were surveyed by Neil Marjoram through the use of spot sampling, sweep netting, ground searching, pitfall traps and refugia traps. The areas were surveyed four times, at the start of each month from August through to November 2012, the exact date of each survey visit being determined by the time of the low tide and suitable weather conditions.

There was no evidence of a significant difference between the composition of taxonomic groups and species between the three areas but sample sizes were limited. More extensive sampling over a number of seasons would provide a more robust conclusion.

The more recent realigned saltmarsh supported three notable species, the picture-winged fly, *Melieria picta*, the planthopper *Aphrodes aestuarinus* and the spider *Singa hamata*. The long established intertidal area supported two notable spiders, *Bianor aurocinctus* and *Singa hamata*. All three areas should be considered valuable to the conservation of these species.

3.4 Yorkshire soft rock cliffs

David Sheppard undertook a survey for NE of the soft-rock resource along the Yorkshire coast between Scarborough and Bridlington in July and August 2012. Cliff sections were assessed in terms of their invertebrate interest features including seepages, bare sand and clay, ruderal plants, sheltered habitats, flower-rich herb-dominated areas and other microhabitats. Three High Interest sections were identified: Cornelian Bay, Speeton Cliffs and Cayton Bay. All were characterised by having active wet and dry exposed substrates, clay slippages, surface-water seepages, short and tall herb-rich grassland with topographical or scrub sheltered areas. Three Medium Interest sections were identified: Scarborough to White Nab, Osgodby Point to Cayton Bay and Filey to Hunmanby Gap. All were characterised by having areas of exposed clay with largely inactive slippages, stabilised slopes with extensive scrub encroachment.

The three High Interest sections were further examined using standard sampling protocols including timed ground searching, timed sweeping and general searching. Analysis using ISIS revealed that the samples taken from Cornelian Bay included invertebrate assemblages representative of a grassland-scrub matrix, flowing water and open wet marsh, specifically riparian sand and shingle banks. Samples taken from Speeton Cliffs included a grassland-scrub matrix assemblage and an unshaded early successional mosaic assemblage. Samples taken from Cayton Bay included invertebrates representative of a grassland-scrub matrix assemblage, an unshaded early successional mosaic assemblage, a shaded ground assemblage and a wet mire assemblage.

The factors limiting the quality of the invertebrate fauna of the soft-rock cliffs appeared to be the quality of the cliff-top vegetation, which determines the floristic quality of the patches of vegetation on the cliff-slope; the cliff-top drainage patterns which determine the process of cliff-top erosion, slippage dynamics and the quality of the surface-water seepages; and the shore-line sea defences which determine the rate of erosion along the base of the cliffs.

Recommendations for further survey focussed on trialling a new simple proxy assessment system involving simultaneous consideration of multiple key resource features of value to invertebrates of soft rock cliffs and a more targeted sampling procedure to assess the condition of High Interest sections focussing on sand and clay exposures, herb-rich grassland and surface water seepages

4. Invertebrates of heathland

4.1 *Ammophila pubescens*

There appear to be important behavioural differences between individuals of this species from its main UK populations in Surrey and an isolated population in North Norfolk, 230 km away. Females in Norfolk utilize a wide range of prey caterpillars, whereas Surrey *A. pubescens*, like females in continental Europe, are restricted to heather-feeders, implying that hunting is restricted to heather plants in Surrey but not Norfolk. Females in Norfolk may mass provision their brood cells (all prey items are placed in the cell before the egg hatches), whereas in Surrey, provisioning is apparently always progressive (offspring are fed gradually as they grow). Females in Surrey sometimes appear to parasitize each others' brood cells, whereas this has never been observed in Norfolk. These differences are of a kind that commonly characterize different species within this large genus, raising the question of how isolated our UK populations are, and whether they could even represent different species.

Non-destructive DNA sampling (by removal of a single antenna) of 12 wasps from Thursley (Surrey), 12 from Witley (Surrey) and 11 from Kelling (Norfolk) suggested that although there were significant differences between all three populations, only a single species was involved.

The nest provisioning behaviour of *A. pubescens* in Surrey was investigated by marking all females (approximately 40) nesting along a few metres of sandy path at Witley Common, Surrey. Their behaviour was observed continuously for as many days as possible in July/August (25 days, although many were only part-days of suitable weather), starting from the first sunny weather after female emergence. This showed very clearly that the Surrey population provisions offspring progressively and within-species parasitism occurs here (five clear cases were documented). A marked female (the 'host') dug a burrow and added the first prey item with an egg laid on it, as normal. A different, marked female (the 'parasite') then removed the host's prey and egg, replacing it with her own prey and egg. The two females then provisioned the parasite egg jointly. In four of the five cases, just two females (host, parasite) were involved. However, in the fifth nest, a total of five different females (host, 4 different 'parasites') entered and provisioned the nest, with the egg being replaced several times, so that it was ultimately unclear which female's egg was finally the one reared! DNA samples were collected for all of the wasps involved in these interactions and the five nests were dug egg to allow the female that successfully laid each egg to be identified following further work.

5. Invertebrates of flower-rich grassland

5.1 *Andrena marginata* in Scotland

Until 2002 *A. marginata* was considered to be extinct in Scotland, but it was re-discovered by Gill Nesbitt at Loch Garten. In 2007 a further bee was recorded and since then an aggregation

has been found in a garden in Invermoriston, as well as at a number of other sites, mainly on private estates.

Murdo Macdonald reported that the management at a number of sites, especially that of Dundreggan Estate (Trees for Life), and CNP sites where there was no protection afforded, were not conducive to the survival of the species. He also pointed out that the owners of private gardens could not be expected to live forever. He saw no way forward to protect populations of this vulnerable species and queried the use of the LBAP list, if it afforded identified species no protection. Stuart Roberts undertook to produce an information sheet on *A. marginata* on behalf of Hymettus.

5.2 Great Yellow Bumblebee *Bombus distinguendus*

This five year Species Action Framework project was completed in 2012. It was funded by SNH with Hymettus, BBCT and RSPB as delivery partners. Hymettus was represented by Murdo Macdonald (Chair of the group) and Paul Lee. The project had three aims; to educate, inform and advise, to create demonstration plots to tie in with the agricultural support system (Caithness & Sutherland), and to train people to monitor the bee using the BBCT protocol. *Colletes floralis* was monitored in parallel in the Western Isles.

The first aim has been achieved very successful. By raising the awareness and profile of the species through schools, farms and the crofting community, local individuals and groups have adopted the bee as their own. The creation of the demonstration plots is still to be completed in full. The third aim was a partial successful but retaining trained monitors proved difficult, especially on relatively remote islands. As there is no further funding the remaining monitors are trained but have been left without support.

Coastal populations of the species were already known, but their extent has been increased and inland populations have now been discovered, mainly in old quarries and neglected fields. At RSPB sites, flower mixes planted for birds have brought in bumblebees, including *B. distinguendus*. There is a reasonably healthy population of *B. distinguendus*, which has not noticeably declined in recent years. The apparent increase may be real or it may be related to the higher profile or number of recorders. The bee has a restricted distribution on the mainland, but the Island populations are stable. Jane Sears (RSPB) reported that there is cause for concern in the Western Isles where the population has apparently dropped significantly in Tiree and Coll (none recorded in Coll in 2012, though the habitat appears to be unchanged). Tiree was considered to be the stronghold of the species over the last 10 years.

5.3 Short-haired Bumblebee *Bombus subterraneus*

The Short-haired Bumblebee partnership was formed in 2009 between Natural England, the BBCT, RSPB and Hymettus. The project, funded mainly by NE, is now in its fourth year. The objectives of the project are to reintroduce a sustainable population of the species in

Kent, to recreate flower-rich habitat in the Romney Marsh area through support for farmers and landowners and thereby to support populations of other bumblebees in the area.

Dungeness and Romney Marshes were chosen as the project area as a landscape scale approach was required to provide a continuity of forage and suitable nesting habitat. Farmers and landowners have been encouraged to support the work by holding farm day events at farms that already had a good habitat structure and were in the ELS. Farmers who were already well respected in the area were targeted in the hope they would then disseminate ideas out to other farms in a domino effect. Full and specific advice was offered, and farms encouraged to apply for ELS funding before it ceases (those already in will get 10 years of funding). Flower mixes were tailored to fit individual land/soil types. People/companies with land interests in the area were approached and became involved e.g. Network Rail, Rye Harbour, National Trust, Great Dixter, Little Cheyne Court Wind Farm, private gardens and small holdings. The Environment Agency were encouraged to only cut at suitable times of year.

The project has resulted in more than 750 ha of good or suitable habitat. Regular transect surveys of the area have suggested increases in populations of *B. ruderarius*, *B. sylvarum* (returned after 25 year absence), *B. ruderatus*, *B. humilis* and *B. muscorum*.

In May 2012 a total of 89 queens of *B. subterraneus* that had not established nests (identified by the absence of pollen loads on the bees) were collected in various locations in SW Sweden, an area very similar in climate to Dungeness. The collecting period was limited to five days to reduce stress on the bees. They were fed and kept in the dark at 4-5°C to induce torpor, brought to the UK by ferry and quarantined at Royal Holloway, University of London for two weeks. During this time Dr Mark Brown carried out faecal screening for parasites. Any queens with parasites were removed if they had not died before 51 queens were eventually released at Dungeness on 28th May 2012. The bees were not seen again and may have scattered over 5-10 miles.

The intention is to continue reintroduction of 100 queens each year for another 2-5 years and survey the Dungeness area to assess the results. The queens forage on White Dead Nettle and so are easy to count. Monitoring will continue for all bumblebee species and the area of suitable habitat will be increased, as will the outreach work to raise the profile of this project. Network Rail have funded a new website (www.subt.org.uk) planned to go live in March 2013.

6. Invertebrates of East Anglian wetlands

6.1 *Odynerus simillimus*

Odynerus simillimus was recorded in two areas of the Broads in 2012, Sutton Fen and Hickling. At Hickling, Tim Strudwick found 900 active nests, well distributed over 4-5 square miles, an increase over the last few years. However, emergence was noticeably later in the season than in previous years. The species was observed to nectar on anything available;

bramble, creeping thistle, chickweed, tufted vetch. There was some change in the vegetation as the area had been fenced off from grazing; Tim successfully requested that this be removed to maintain suitable habitat for nesting. At one farm a new bank had been built and planted up for aculeates. The top of the bank was being kept clear using Round-Up. In 2012 over 100 nest holes were found at one end.

6.2 *Rhopalum gracile* and *Passaloecus clypealis*

Following on from trap nesting for the solitary wasps *Rhopalum gracile* and *Passaloecus clypealis* in 2011, Tara Marjoram replaced eighty trap nests at Woodbastwick Fen NNR, Norfolk in March 2011. The traps were constructed from common reed (*Phragmites australis*) stems packed into 15cm lengths of 5cm diameter plastic water pipe and mounted on bamboo canes. Three empty traps and 77 reed bundles were collected in March 2012. Four trap nests were found at ground level. Reed bundles were immediately placed into ziplock bags and processed within two days. All stems were dissected and any pupae discovered were placed in gelatine capsules and left outside to develop. Pupae were monitored for emergences daily from 1st May until 6th August 2012.

No pupae, body parts or adults of either *Passaloecus clypealis* or *Rhopalum gracile* were discovered. The most successful user of the traps was *Anoplius caviventris* of which 36 pupae were discovered with up to six in a single stem. In total, eight adult wasps emerged, the first on 30th May (3 male, 2 female) and the last on 4th June (one male). *A. caviventris* appeared to prefer cavities of 5mm diameter for nesting.

One *Hylaeus pectoralis*, one *Ancistrocerus trifasciatus*, several *Gasteruption assectator* and a few Ichneumoninae also emerged from the reed stems. Both Diptera and Coleoptera were also discovered.

6.3 *Lipara similis*

The species of the genus *Lipara*, whose life histories are known, are all associated with the stems of common reed (*Phragmites australis*). They form a more-or-less obvious cigar gall in the apex of the stem. The Lesser Reed-Gallfly, *Lipara similis*, is the rarest of the three species known to occur in Britain and is a s41 species. It is historically known from Wicken, Chippenham and Woodwalton Fens in East Anglia and more recently single specimens were found in Redgrave and Lopham Fen on the Suffolk/Norfolk border and two sites in the New Forest, Hampshire. The study by John and Barbara Ismay was intended to elucidate the taxonomy of the *Lipara* species occurring in Britain and enable the preparation of keys to the adults of these species and the galls they cause.

Between February and April 2011 samples of galls were taken from 84 subsites on 10 sites. The sites were Wicken Fen NNR, Redgrave and Lopham Fen NNR, Chippenham Fen NNR, Holme Dunes NNR, Titchwell SSSI, Woodwalton Fen NNR, Cothill SSSI (Parsonage Moor only), Holkham Dunes NNR, New Forest NNR (Strodgemoor Bottom, east of Burley Street) and North Solent NNR (Beaulieu). One additional sample was taken from Thame,

Oxfordshire and included in the results. At each site galls were located and provisional identifications to species made on the basis of the appearance of the galls.

At each site galls were located and provisional identifications to species made on the basis of the appearance of the galls. It is necessary to rear the adults and identify these to confirm the characters of the galls. The thickness of each gall was measured at base and middle at time of collection. The samples were stored individually in sealable bags and moistened twice per week, a system which has worked well in the past when rearing adults. After emergence the adults were then frozen or stored in denatured alcohol. Adults stopped emerging from the samples in early June 2011. The emerging flies included *Lipara* species, other Chloropidae, Scathophagidae, Anthomyzidae and there was a rather large percentage of parasitic Hymenoptera. In total 556 specimens were reared, of these 347 specimens including all *Lipara* species have been identified. 54 galls produced no insects and the remainder produced 88 *Lipara*. Within the *Lipara*, 34 specimens of *L. lucens* were reared, 15 specimens of *L. similis*, 13 specimens of *L. rufitarsis* and 4 specimens of *L. pullitarsis*. However, the last two can only be identified by examination of the male genitalia and 22 females could not be assigned to one of these two species. The final report includes a key to species including to *L. pullitarsis*, a species that will be officially added to the British list in a separate paper. It also includes a description of the galls, but these cannot be used for identifications; *L. lucens* only emerged from *lucens*-type galls and *L. similis* only emerged from *similis*-type galls, but *L. rufitarsis* and *L. pullitarsis* emerged from all four gall types. Adult rearing seems to be the best method of recording the species except for *L. lucens*, a rather common species. Work in Poland has suggested differences in the morphology of eggs, larvae and pupae of all four species, but this needs further testing in other countries.

Ecological data gathered in spring included estimated distance from scrub or degree of shading, water levels, density of reed stems and notes on management, if available. Sites were revisited at the end of the growing period (August to October) to take the same measurements again, except that reed stem density was measured as low on the stem as possible (ca. 40 cm above ground). The small number of *L. similis* reared made it impossible to use statistical analysis of the environmental variables. However, the findings and the existing records indicate that *L. similis* is confined to a few localities (a maximum of 6 and only in very low numbers) and supports its status as a s41 species. Further rearing is necessary to determine the habitat preferences of this species.

7. Invertebrates of open woodland

7.1 *Neoempheria lineola*

The very few records of this species all come from the New Forest in Hampshire apart from a single specimen caught in Oakley Wood, Cirencester, Gloucestershire in 1986. Unfortunately the Bathurst Estate refused permission to look for this species in Oakley Wood so survey work was confined to the New Forest. In 2011, after three days of searching the three known sites in the New Forest with recent records, no specimens of *Neoempheria lineola* had been

found. Indeed fungus gnat abundance and diversity seemed to be particularly poor, for instance only a single female specimen of *Neoempheria pictipennis* was found. Given this it seemed likely that the very warm and dry spring had had a negative effect on the abundance of fungus gnats.

In 2012, after a very wet April and early May it was hoped that the fungus flora would be healthy and the chance of finding *Neoempheria lineola* potentially enhanced. Survey started on 16th May with a visit to Denny Wood. This was followed by searches of Brinken Wood on 17th May and The Knowles on 18th May. The remaining two days available were spent at the sites with the greatest potential, because they had more contemporaneous records, Denny Wood on 23rd May and, The Knowles on the 28th May 2012. On each of these visits, areas that had looked most interesting from previous visits were searched again, and the search area expanded as much as time allowed.

Despite the very wet period preceding this survey, neither fungi nor fungus gnats appeared to be any more abundant than in 2011. Indeed this year the five days of search at three sites did not even produce an example of the genus, let alone *Neoempheria lineola*. It is clear that this species is not only exceedingly rare and limited in distribution, but also occurs in low density in most years. It is possible that this fly was affected by the sub-optimal weather conditions, very dry in 2011 and rather cool on most days in 2012, but it seems unlikely that no specimens at all would be found if it occurred in sufficient numbers to enable study except very infrequently and unpredictably. Possibly it could have been overlooked if it has a very limited flight period in any one year, but such speculation cannot be substantiated.

7.2 *Osmia pilicornis*

Rosie Earwaker reported on her study of this bee whilst working for RSPB. There has been a widespread decline in the population of *Osmia pilicornis* over recent years, with only 3 recorded sites remaining in the UK, one in each of Kent, West Sussex and Gloucestershire. The bee's habitat is coppice woodland with forest clearings, plus clear-felled coniferous woodland, where bugle and ground ivy flower (the bee is polylectic). What is required is a cyclical pattern of coppicing, where coppicing is carried out in succession, rather than random disconnected areas of coppice. Dead wood in the sun, in sheltered areas, is required for nesting. Second year coppice appears to be most suitable.

The study aimed to identify potential sites and record the bee, to identify habitat requirements by devising a Habitat Suitability Index (HSI) and to engage RSPB staff at the sites identified. The HSI used ten environmental / ecological variables including forage, deadwood and canopy cover. These factors are not weighted. *Osmia pilicornis* was confirmed as present at Tudeley Woods in Kent, and 20 potential sites were identified. Because of the coppice rotation, sites where the bee had previously been recorded did not have a high score on the HSI. Future work will be to look for further sites, to test the HSI and to analyse pollen loads for content to confirm forage species.

Mike Edwards suggested that one way of finding potential sites for this species is to look for sites that support the Pearl-Bordered Fritillary *Clossiana euphrosyne*, which has similar requirements. Stuart Roberts estimated its foraging range as being approximately 1km, emphasising the need for blocks of coppice to be close to each other rather than dispersed.

8. Development of Hymettus Ltd.

8.1 An Annual Report and accounts for the year from 1st April 2011 to 31st March 2012 have been prepared for submission to Companies House and the Charity Commissioners as required by law.

8.2 Hymettus continues to work with partners including commercial organisations, academic institutions and other non-hymenopteran interest groups. Hymettus has continued to support three projects funded under the Insect Pollinator Initiative. The first, entitled *Impact and mitigation of emergent diseases on major UK insect pollinators*, is led by Dr Rob Paxton in partnership with Dr Mark Brown at Royal Holloway, University of London and Dr Juliet Osborne at Rothamsted Research. Hymettus has been involved in a second year of collecting samples of bees from the field at sites across Britain. These bees are then tested for disease prevalence at Royal Holloway, University of London.

8.3 The second and third IPI projects both involve Hymettus providing taxonomic skills in the identification of thousands of field collected specimens. The second project is *Linking agriculture and land use change to pollinator populations* led by Professor Bill Kunin at the University of Leeds in partnership with Professor Jane Memmott at the University of Bristol, Dr Nigel Boatman at the Food and Environment Research Agency, Dr Richard Morton at the NERC Centre for Ecology and Hydrology and Dr Simon Potts at the University of Reading. The third project is *Sustainable pollination services for UK crops* led by Dr Koos Biesmeijer at the University of Leeds in partnership with Dr Mette Termansen and Dr Andy Challinor at the University of Leeds, Dr Giles Budge at the Food and Environment Research Agency National Bee Unit and Dr Simon Potts at the University of Reading. Further details of all three projects can be found on the BBSRC website at <http://www.bbsrc.ac.uk/pollinators/>.

8.4 Hymettus is working with Natural England to reassess the UK conservation status of various invertebrate taxa using IUCN Red List criteria in line with the practice in the rest of Europe. The criteria now describe the risk of extinction of a species, not its rarity. An important aspect of assessing the risk of extinction is an examination of trends in population size and/or distribution but for many invertebrates the hard data to identify trends is sparse or even non-existent. Hymettus has been looking at taxonomic groups where data modelling might be used to investigate trends (aculeate Hymenoptera), where recording scheme data alone has to be relied on (Myriapoda & Isopoda) and where expert opinion has to be relied on as recording scheme data is inadequate (Neuroptera).