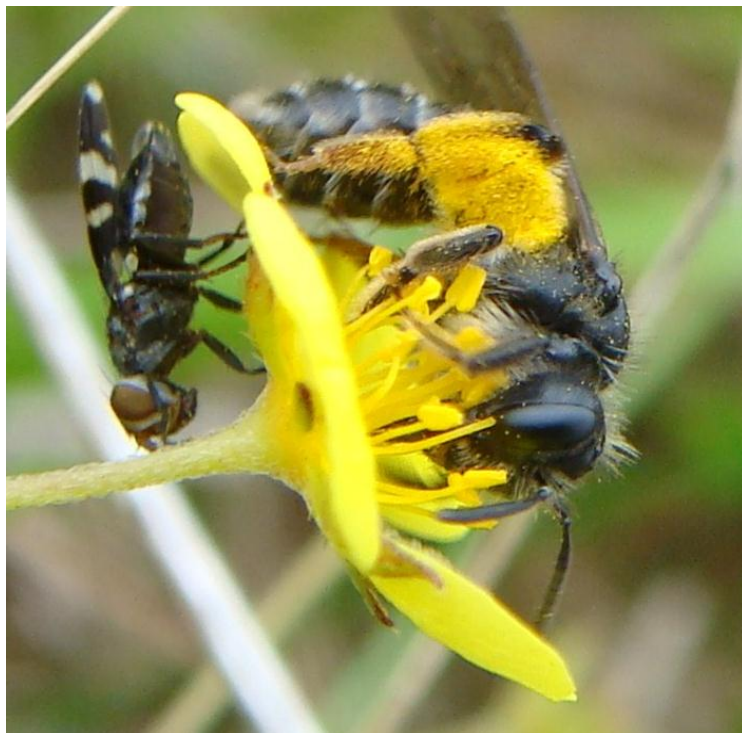


Hymettus

Hymettus Ltd Research Report for 2010

Compiled by Paul Lee



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Andrena tarsata by Louise Hislop

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Hymettus Research Report for 2010

1. Background to 2010 research

1.1 This report deals with the research programme originating in discussions of the Steering Group at the 2008 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 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. Most of the Hymettus research in 2010 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 four flies, ten ground beetles and a leaf hopper.

1.3 Alongside work on UK BAP species, research continued on a number of other aculeate hymenoptera. The Steering Group had identified the need for research as little is known about the true status and / or ecology of these species and the work was considered to be of high importance in addressing their conservation needs.

1.4 The research is reported mainly as autecological studies within seven ecological / geographical groupings.

2. Shingle & sand dune invertebrates

2.1 Ants at Dungeness

Brian Banks has been attempting to determine for *Tetramorium caespitum* (as the host of *Anergates atratulus*) and *Temnothorax interruptus* whether there are significant differences in the abundance of nests in different vegetation communities on Dungeness. Hanging tiles placed on the ground proved to be a useful way of surveying for *T. caespitum*. The tiles become warm under sunlight and are attractive to ants rearing larvae and cocoons. The degree of colonisation of tiles was variable. This might indicate differing densities of ant

nests; however, other factors could be influencing the results. *T. caespitum* was found in varying abundance on areas of acid grassland, the older vegetation community that succeeds Broom scrub at Dungeness. It was most abundant on ungrazed acid grassland (A2 in the Ferry *et al.* classification) on high dry shingle ridges, although relatively high densities of the species were also found on slightly damper, more mesotrophic shingle communities, again with a higher rate of occupancy of tiles in ungrazed areas. The same habitat close to the sea produced only small numbers of foraging ants. The shingle vegetation in this area was succeeding from an A2 sub-community to the A2f variant with a greater abundance of maritime species such as Thrift *Armeria maritima*. It is possible that important food-plants are less abundant in this area. Certainly Wood Sage *Teucrium scorodonia*, which supports aphids that are visited by this species, was noticeably uncommon in this area. This ant was also very scarce on ridges that had had a history of heavy grazing pressure where Wood Sage was also very scarce. Unfortunately none of the monitored nests contained *A. atratulus*. Only three *Temnothorax* nests were found under tiles. A nest containing all three species was in an area of ungrazed A2s; a nest of *T. nylanderi* was found in an area of grazed A2s and a nest of *T. albipennis* was found in one of the *Arrhenatherum* areas at Rye. *Temnothorax* nests were frequently found in dead herbaceous vegetation such as Sea Kale *Crambe maritima*, Foxglove *Digitalis purpurea* and Ragwort *Senecio jacobaea* but none of these were nests of *T. interruptus*. At the end of the survey 72 occupied tiles were left on the shingle, together with a further 80 left in the vicinity that could potentially be occupied, for monitoring nests in future studies.

2.2 *Doratura impudica*

Alan Stewart began a study to characterise more precisely the micro-habitat of the bug *Doratura impudica* and then to use these characteristics to predict where it may yet exist undiscovered. He has collated all the existing records, which are basically restricted to sand dunes along the coasts of East Anglia and the south-east counties of Kent and Sussex. In 2010 he focused on visiting sites in the south-east. This included spending some time examining the known habitat at Sandwich Bay, for which there are reliable and recent records, and which accords very well with other sites in East Anglia where *D. impudica* has been collected previously. It is a rather specialised and vulnerable sort of habitat, and one that is often missing in other, smaller, dune systems: sparse pioneer vegetation (often Sea couch Grass *Elytrigia juncea*) on the seaward edge of the dunes. Searches of other sites along the Kent and Sussex coast have produced only very small areas of the required habitat, if any, and unsurprisingly none of the bug. On the other hand, there is a record of *D. impudica* by Peter Kirby for Rye Harbour, which has no sand dune habitat to speak of, so the story may be more complicated.

3. Invertebrates of the North Sea and English Channel coasts

3.1 *Colletes halophilus*

Adrian Knowles investigated the environmental conditions necessary for nest establishment by the Saltmarsh Mining Bee *Colletes halophilus*. Nest site data were collected from Colne Point, Walton Hall Marshes, Mersea Stone and Alresford Creek in Essex. At Middle Beach Dovercourt, no nesting activity was found but *C. halophilus* was present on the adjacent saltmarsh and it is thought likely that the area surveyed will support nests. In addition to these sites, a number of more speculative survey walks were undertaken along parts of the River Orwell estuary in Suffolk. At confirmed nesting locations, the soil characteristics at the surface were assessed using the Bryophyte Ecology Group soil texture key. Photographs of the location were taken and the typical vegetation surrounding the nests was recorded. Colne Point, Stone Point (Walton Hall Marshes), Middle Beach Dovercourt and Mersea Stone all have a similar juxtaposition of sand dune and saltmarsh habitats i.e. a seaward ridge of sand with saltmarsh behind. Observations at Alresford Creek show that the species is capable of nesting in very different locations. Here, *C. halophilus* is nesting in distinctly damp, silty/clayey substrates, whereas at the other sites the nesting substrate is sand or loamy sand at best. The one unifying feature of all sites visited appears to be that the nesting substrate will be prone to relatively high levels of moisture. Stuart Roberts has noted that recent work on nesting requirements of continental populations suggested that the substrate needs to be one which binds together to allow large nesting aggregations to form. The nesting aggregation at Colne Point may get temporarily inundated by the highest of the spring and autumn tides, a situation that has also been observed at Alresford Creek and at Scolt Head Island on the north Norfolk coast. Mike Edwards has pointed out that flooding on extreme tides provides the ecological stress necessary to maintain more open vegetation. The nest sites at Mersea Stone and Stone Point were at slightly higher elevations, but groundwater or waterlogging after persistent rain may also result in quite moist nesting conditions. Equally, it is not known how deep the nesting tunnels penetrate the ground towards damper conditions. The apparent situation at Alresford Creek, where the bees are deliberately nesting close to the high water mark when seemingly similar substrate higher up the embankment face is relatively under-utilised, suggests that there is some ecological advantage in doing so. Possibly this may reduce competition for nesting substrate from other aculeates.

Another aspect of the work on *C. halophilus* was to use Environment Agency (EA) coastal erosion and sea defence models to map areas of high potential risk within the range of the bee. Adam Baylis of the EA in Leeds has been managing a study looking at saltmarsh loss and sea level rise. In October 2009 the EA reported that this work would be completed within 'a few months'. The data from this study was to form the basis of the planned appraisal of *C. halophilus* in East Anglia, identifying where it is most vulnerable and where coastal realignment projects are likely to be of value to the conservation of this species. The findings of the EA report have only just become available in early 2011.

3.2 *Pogonus luridipennis*

John Walters is collating existing biological records to determine the current English distribution of the carabid beetle *Pogonus luridipennis*. The beetle seems to have declined significantly in recent years and there are no sites where the beetle can now be found reliably. Visits to Salthouse, Norfolk on 28th August and to Ferrybridge, Dorset on 12th October failed to locate the beetle at two of its previously known sites.

3.3 *Philorhizus vectensis*

John Walters is collating existing biological records to determine the current English distribution of the carabid beetle *Philorhizus vectensis* and also attempting to characterise its micro-habitat. *P. vectensis* is proving to be a difficult species to study as it seems to occur at a low density throughout its range. It could not be found on visits in May or September to the cliffs at Torcross, Devon, the only British locality where the beetle can be found reliably, but six individuals were found in similar habitat, grass tussocks on cliff faces, further south along the cliffs at Dun Point (SX 823 416) on 18th May. A further individual was found walking over bare, chalky ground at Southwell landslip, Isle of Portland in September. Shingle at Ferrybridge, Chesil Beach on 12th October, Gribbin Head, Fowey and the cliffs from Rame Head to Queener Point, Cornwall on 20th October and Bolberry Down, Devon on 22nd October were searched without success. Locating sites where the beetle can be found reliably is key to understanding more about its ecology.

4. Invertebrates of early successional stages of vegetation colonisation including arable field margins

4.1 *Andrena nigrospina* and *Nomada fulvicornis*

Andy Jukes led a study to determine nest site parameters and lekking behaviour of the mining bee *Andrena nigrospina* with the aim of assessing the impact of site management on populations. Also, DNA samples (from leg segments) were taken with a view to determining the relationship between the *nigrospina* form and the *bimaculata* form of the cleptoparasitic bee *Nomada fulvicornis*. These results will be available during 2011. *A. nigrospina* was observed at five sites in 2010: Highgate Common, Staffordshire (SO838898); Upper Blackstone Farm, Worcestershire (SO800747); Burlish Top Corner, Worcestershire (SO805737); Wilden bike track, Worcestershire (SO826727) and Anchor Field, Essex (TQ558783). Nest sites were located on flat surfaces, inclined surfaces, bare surfaces, vegetated surfaces, compacted soils and friable soils. On friable soils nests were constructed amongst the roots of vegetation, presumably to provide stability for excavation. Three nests were excavated to provide information on the internal structure. When encountered on flat

ground, the nest entrance can have a small tumulus though this does not appear to be a consistent feature. On inclined slopes, a splayed fan of spoil on the downside of the nest entrance is nearly always present. The nest proper retreats from the entrance by at least 25cm. The vertical depth may be less with one nest being 20cm in “true depth” from the soil surface (Highgate Common). Where the nest was on the side of a track in an inclined slope, it went back near-horizontally for approximately 5cm then descended at a steep, near vertical, angle to deeper soils. The nests appear to have anti-tunnels but no terminal chambers were found. One nest (Highgate Common, 07/07/10) had two medium-sized larvae (c.10mm long). Lekking at Highgate Common was observed on two separate occasions on 15th June between 12.30 and 13.30 hours. It involved 3-5 males swarming around isolated Broom scrub for several minutes before dispersing. A possible female was also involved though this cannot be categorically stated. Several males were also noted on continuous Broom scrub nearby on the same day. They swarmed along the length of the scrub for several minutes before dispersing. *N. fulvicornis* (*nigrospina* form) was recorded from Highgate Common, Upper Blackstone Farm, Burlish Top and Anchor Field. Single pollen samples were collected from *A. nigrospina* at Anchor Field, Upper Blackstone Farm and Burlish Top Corner. A variety of pollens other than the suspected Oilseed Rape and Wild Radish seem to be used. *Papaver* type pollen was dominant in one sample and Rosaceae in another (probably a bramble or rose). However, analysis of more samples is necessary to draw firm conclusions. Observation suggested the possibility of a switch in pollen preference during the course of a day and changes as the flight period progresses are also highly likely. As with pollen, observations suggested the nectar preferences are wide ranging.

4.2 *Harpalus froelichii*

John Walters investigated the viability of habitat creation by soil disturbance in areas of the Brecks close to existing colonies of the Brush-thighed Seed-eater *H. froelichii*. Recently, Butterfly Conservation has established about 60 bare ground plots in the Brecks by turf-stripping and rotavation. This work has been targeted at the conservation of Grey Carpet Moth *Lithostegia griseata* and other insects and plants typical of early successional habitats in the Brecks. The plots vary in size from a few square metres to narrow strips of over 200 metres long. Butterfly Conservation advised which plots had Fat Hen *Chenopodium album* established on them and therefore may provide potential habitat for *H. froelichii*. A number of these plots were visited on 23rd and 24th August 2010. Diurnal hand searching produced two specimens of *H. froelichii* at Aspall Close, Mildenhall (TL 698 777) and one at Ramparts Field (TL 787 716). A further specimen was found in an arable field margin (TL 726 828) close to the Maidscross Hill plots. No beetles were found in four plots at Kings Forest (TL 785 725), three plots at Cranwich Heath (TL 803 935) and two plots at Maidscross Hill. Creation of bare ground plots appears to be an effective method of creating habitat for this beetle as long as *C. album* is present in sufficient quantity to provide enough seed to support the beetle. Following its recent discovery in Lincolnshire it may be found in other suitable sites in eastern England in future.

4.3 *Ophonus laticollis* and *O. melletii*

John Walters is collating existing biological records to determine the current English distribution of the carabid beetles *Ophonus laticollis* and *O. melletii*. The best known British site for *O. laticollis* was visited at Gallows Hill, Thetford but no specimens were found. However, several specimens had been taken by another researcher in 2010 from a number of arable fields to the south east of Gallows Hill. No searches were made for *Ophonus melletii* in 2010 but the beetle was recorded from a single site in Kent.

5. Invertebrates of heathland

5.1 *Formica exsecta*

Stephen Carroll continued the long term annual monitoring of nests of the Narrow-headed Ant *Formica exsecta* at Chudleigh Knighton Heath SSSI including monitoring the impact of management operations (grazing, swaling and scrub cutting) on both *F. fusca* and *F. exsecta* nests. In 2010, 86 active nests were found, 59 were re-located from previous years, 17 nests were lost and 27 new nests were found. Newly colonising nests were generally within 10-15m of areas with known nests. There were many fewer satellite nests compared to 2009. The increase in overall nests recorded may be due to active management over recent years but could also be due to better nest detection. Nests were newly re-marked in 2010, instead of relying solely on GPS references and marker posts from earlier years. This revealed little double counting of satellite nests (~3 nests) as new nests. The totals have been corrected for this. Unmarked nests with fresh new thatch were sometimes discovered close to nests marked during the previous site visit, 5-6 days before. It seems unlikely that these conspicuous new nests would have been missed, so the suggestion is that new nest generation could happen relatively quickly within this time period. Some nest sites abandoned or inactive in previous years were found to be reactivated in 2010. Some nest sites which had become *Myrmica* or, in one case, *Lasius* nests previously, were found to be *F. exsecta* nests once again in 2010. It may be notable that re-colonisation of cleared and edge areas has occurred only where there was a source population of existing nests nearby. In the context of a short time scale of 2-3 years' results and a small data set, selective cutting / swaling of relatively small areas, so retaining a relatively large proportion of edge habitat compared to area managed, seems to generate favourable conditions for re-colonisation. The edge areas perhaps balance the advantages of open conditions for insolation and movement of nests, while still being in relatively close proximity to foraging habitat. However, this interpretation is speculative. There are no exclosures so the effects of follow-up grazing could not be assessed. A small number of individual nests are probably trampled or dunged upon, while grazing might be anticipated to impede or reduce the rates of overall scrub encroachment and succession.

Stephen is also investigating the ecological succession of ant species that occurs in decaying stumps and leads to nest establishment by *F. exsecta*. At Chudleigh Knighton Heath 21

artificial ‘stumperies’ were set up during 2009 and 22 further existing cut tree stumps were identified for future monitoring. Five additional existing cut stumps were identified in 2010 for monitoring. In addition, during the winter works season 2009/10, a line of over 20 stumps was set up on Highways Agency managed land, on the A38 footpath verge. All stumperies were checked in May 2010 and August – September 2010. Two nests in existing stumps contained *Lasius* in May. One had gone by August though the other was still active. A further two stumperies contained chewed sawdust in August, a sign that ants had been actively colonising the stump in the last few months. However, neither was active in August and the particular ant species involved could not be determined. None of the monitored stumperies had been colonised by *F. fusca*. One of the newly constructed stumperies, close (within 1-2 metres) to an existing *F. exsecta* nest (112), had been colonised by that nest. Another new stumpery showed some signs of colonisation by a nearby existing nest, but that nest was inactive in August. None of the new stumps set up on behalf of the Highways Agency on the A38 road verge had been colonised by August. However, these had been in place for only a relatively short period by this time. When stumperies had been colonised by ants (3 stumperies so far, 1 new and 2 existing), nibbled sawdust material was evident under loosened bark. This suggests that for future stumperies, bark should be left on stumps; also grouping together of several stumps with bark would increase the surface area available for nests. After one year *in situ*, new stumperies had started to show some signs of decay, which differed according to age of stumps used, species of tree, and exposure. Most stumperies showed signs of beetle colonisation. It may be that the majority of stumperies are still not sufficiently rotted to facilitate ant colonisation.

5.2 *Formica rufibarbis*

Although not a Hymettus led project, Hymettus is represented directly on the steering group for the Red-barbed Ant *Formica rufibarbis*. Scott Dodd, Surrey Wildlife Trust’s lead for conservation work on the species, reported that three years of HLF support for strengthening the population of the ant at Chobham Common came to an end in 2009. The project involved collecting dealate queen ants from the Scillies, raising colonies in captivity, checking for diseases and then releasing the colonies into carefully chosen and prepared sites at Chobham. The final year of funding enabled autecological and genetic studies of the ants to continue as well as providing for the design and erection of an interpretation board at Chobham Common explaining the importance of the site. The genetic work indicates that, although all samples belong to the same species, the Surrey ants are more closely related to those in the near continent than to those on the Scillies. In 2009 a new nest was discovered at Chobham in a roadside verge but was almost immediately threatened by the laying of a new gas main. Although negotiations with the utility company appeared to have protected the nest the contractors proceeded to park their vehicles on the nest site. Fortunately, the ants had already moved the nest a little further away from the road. In 2010 Natural England financially supported monitoring of the ant colonies, including *F. sanguinea* and other species, at the release sites on Chobham Common. *F. rufibarbis* activity was noted at some of the release

sites but a wider survey failed to locate any new nests. Further field survey, monitoring, autecological studies and genetic studies are planned for 2011.

5.3 *Tapinoma ambiguum* and *T. erraticum*

Paddy Saunders began a study to determine the environmental and ecological factors characteristic of sites inhabited by the ants *Tapinoma ambiguum* and *T. erraticum*. Specifically he aimed to test the hypothesis that *T. ambiguum* favours vegetation communities on wetter peat and *T. erraticum* favours those on drier sand. Between 18th May and 30th July Godlingston Heath was surveyed for *Tapinoma* ants; parts of Stoborough and Hartland Heath were surveyed on 29th and 30th July and Bovey Heathfields and parts of south Dartmoor were visited on 11th August. Having located either an individual or colony the soil type, vegetation type and an eight figure grid reference was recorded and voucher specimens were taken. Where possible, points at 50m and at 100m north, east, south and west of the initial record were searched and soil type, vegetation type and eight figure grid references were recorded. Confirmation of the identity of a number of voucher specimens is awaited. *Tapinoma* spp. on Godlingston Heath were usually found close to some sort of wet heath feature but not just on wetter peat. The sites often seemed to be centred on the boundary between dry and wet heath features but soil and vegetation data has not been analysed as yet. Godlingston Heath has high ridges of dry heath on the edges of basins of wet heath. Probably more than 60% of the heath could be called wet heath, with most areas of the heath being close to some sort of wet heath feature. This may make it difficult to say for other than any colonies on the extreme southern edges, that colonies have no wet heath association. *Tapinoma* ants were not found in dry, sandy heath, scrub and grassland habitats towards the southern and eastern edges of Godlingston Heath or on the edges of Studland Heath. Single specimens of a *Tapinoma* sp. were found at Hartland Moor NNR on the edge of dry scrub heath (but close to a large area of wet heath) and at Stoborough & Creech Heaths RSPB reserve within a small area of wet peaty sand habitat with *Erica tetralix*, *Calluna* and *Molinia*. One *T. erraticum* was found at Bovey Heathfields within dry heath and a number of the same species were found at Newbridge, Dartmoor on south facing dry heath with Gorse scrub.

5.4 *Pseudepipona herrichii* and *Homonotus sanguinolentus*

With funding from Defra, Chris Dieck undertook initial surveys to determine the current English distribution of the Purbeck Mason Wasp *Pseudepipona herichii* and the spider hunting wasp *Homonotus sanguinolentus*. The sites selected for survey were those listed in the 2009 dataset held by the Bees, Wasps and Ants Recording Society (BWARS). All of these sites were visited between 16th July and 28th August 2010 with the exception of Studland Heath, Furzebrook and Tadnoll Heath. Furzebrook may indeed refer to Creech, Grange and / or Stoborough Heaths, all of which were visited during the survey. At each site suitable nesting conditions, i.e. exposed clay seams, in the vicinity of the recorded grid references were investigated for adult activity and nest burrows of *P. herrichii*. Survey for *H.*

sanguinolentus involved locating the egg-laying retreats of the host spider *Cheiracanthium erraticum* in the tops of grasses and other vegetation primarily in bogs and wet or humid heathland. A small hole was made in the retreat using fine forceps and the spider was investigated for the presence of larvae of *H. sanguinolentus*. The presence of *C. erraticum* eggs or young was recorded as *C. erraticum* lays no eggs once it has been parasitized. Only very few (4) adults of *P. herrichii* were recorded, possibly due to inclement weather for most of the survey season. Despite this females were seen at Stoborough Heath (RSPB), at the main colony on Godlingston Heath near the Puckstone and at the Slepe Heath boundary site. All three of these sites also held substantial amounts of nesting burrows. This is especially significant at Slepe Heath, which supported a colony up to 2008, when it was feared destroyed by a utility company burying a power cable. It is encouraging that the colony has apparently recovered here. Beyond these three main sites, smaller numbers of nesting burrows were also recorded from Grange Heath and the Hartland Moor Tramway. No wasps or burrows were found at the most recently discovered site at Upton Heath. No adults of *H. sanguinolentus* were found in 68 *Cheiracanthium* retreats and none were encountered away from the spiders' cocoons. Three pinkish pupae were found in retreats, one on the edge of Godlingston Heath, the other two in the New Forest, which may prove to be *H. sanguinolentus* pupae. Two of these have been collected in an attempt to rear them to adults.

5.5 *Andrena tarsata*

Louise Hislop was asked to assess localised changes in the status and distribution of the solitary bee *Andrena tarsata* on the North York Moors and to relate these to changes in availability of pollen resources. The NBN dataset contains five records of *A. tarsata* within the area of the North Yorkshire Moors. Only one of these records is to 100m resolution. The records date from 1937 to 1988-1991. The distribution of Tormentil *Potentilla erecta* on the NBN Gateway is mapped only to 10km squares. Discussions with the Yorkshire Naturalists Union have established that their previous vice-county recorder did not collect data at a higher resolution. Thus it has not been possible to compare previous distributions with that of today. The area was visited on five dates in total between July and the end of August 2010. The distance between the initial five sites prevented each site being visited on each date. Those sites that appeared to have the most potential, based on the presence of *P. erecta*, were visited more often. Driving between the well-spread sites provided some opportunity to investigate other potential sites and try to identify areas of likely habitat. The presence or absence of *P. erecta* was mapped along as many roads as opportunity provided and sites were identified for further investigation. *A. tarsata* was only found at Jugger How. The lack of *P. erecta* at Caydale and Gundale and the limited amount at Saintoft Pits suggest that it is unlikely that these sites would support *A. tarsata*. Sub-sites within Hole of Horcam and Harewood Dale Forest, having larger amounts of *P. erecta*, though possibly of low quality, appear the most likely to support *A. tarsata*. Pollen analysis from female *A. tarsata* at the Jugger How site indicated that the pollen was of *Potentilla* type but it is not possible to separate pollen from this genus to species level. However, as there were no other species of *Potentilla* within 250m it is reasonable to infer that the pollen gathered by the bees on this

occasion at this site was all from *P. erecta*. There are not enough records of either *A. tarsata* or *P. erecta* at a high enough resolution to establish a link between any changes in distribution of *Potentilla erecta* and those of *Andrena tarsata*. Stuart Roberts noted that the bee does use other species of *Potentilla* in Europe as well as other Rosaceae (*Fillipendula* and *Rubus*) and has been observed visiting *Calluna* for nectar.

5.6 *Cicindela sylvatica*

Scott Dodd is collating existing biological records to determine the current English distribution of the Heath Tiger Beetle *Cicindela sylvatica*. Also he is undertaking a desktop review of existing autecological information for the beetle. The distribution data clearly show a dramatic range decline. The strongest populations of *C. sylvatica* apparently occur in Dorset where the species is fairly widespread in suitable habitat. A scoping visit was made to the Isle of Purbeck area (Studland, Hartland Moor) during May 2010 to locate sites where historic records existed. Unfortunately, overcast weather conditions prevailed and zero activity was observed, though the visit was still useful for assessing the quality of the habitat. A further visit was made in October 2010 to locate further sites for survey in 2011, when the few Hampshire and Sussex sites will also be visited. Although outside the scope of this project, former Surrey strongholds have been thoroughly surveyed in optimal conditions over several years with negative results. The desktop review has revealed few studies on the autecology of the species and there is a particular need for further work on the larval ecology of the beetle.

5.7 *Poecilus kugelanni*

John Walters is investigating the optimum habitat management techniques for Kugelann's Ground Beetle *Poecilus kugelanni* by studying the impact on beetle populations of grazing, burning, cutting and the creation of bare ground on heathlands. Three sites in Hampshire (Furzley Common, Parc Pale & Matley sandpit), one in Dorset (Tadnoll) and two in Devon (Aish Tor and Aylesbeare Common) were visited to search for *P. kugelanni* in May and June 2010. Varying numbers of baited pitfall traps were used at each site except Furzley Common and Tadnoll where hand searching was used. *P. kugelanni* was found on every site apart from Tadnoll. The main investigation will take place at Aish Tor and at Aylesbeare Common where a range of management techniques are in use. Cutting and controlled burning is practised at Aish Tor. Six traps were set here between 7th and 21st June in areas subject to different management techniques over the last few years and the numbers of *P. kugelanni* caught were recorded. At Aylesbeare 11 traps were set between 8th and 22nd June in areas which have been subject to different management techniques. The numbers of *P. kugelanni* caught were recorded. Baited pitfall traps will be used at both sites in 2011 to determine the effects of winter management.

5.8 *Amara fusca*

John Walters is attempting to characterise the micro-habitat of the Wormwood Moonshiner *Amara fusca*. The presence of its main foodplant Field Wormwood *Artemisia campestris* seems to be the main limiting factor in the distribution of *A. fusca*. As this beetle has a short, late season of activity and is most effectively collected after dark, it may be overlooked by coleopterists. The beetle will use Mugwort *Artemisia vulgaris* but these populations do not appear to be as strong and it seems likely that if this foodplant were suitable then the beetle would be more widely distributed in Britain. Three Breckland localities, the only sites where the beetle has been reliably found in recent years, were visited on 24 August. The sites were not searched after dark but *A. campestris* was found on only one site, Brandon *Artemisia* Reserve, and this was the only locality where a single specimen of *A. fusca* was collected. Crymlyn Burrows, Swansea was visited on 21 September and the very few patches of *Artemisia* found were searched both during the day and at night. No *A. fusca* were found and it seems unlikely that such a small population of the foodplant could support the beetle.

5.9 *Anisodactylus nemorivagus*

John Walters is collating existing biological records to determine the current English distribution of the Heath Short-spur *Anisodactylus nemorivagus* and attempting to characterise its micro-habitat. Field visits in May and June failed to locate the beetle at Peel Hill in the New Forest. This has been a reliable place to find it in the past and it had been intended to undertake the autecological study here. Two other New Forest sites at Stagbury Hill, Furzley Common and Parc Pale, Lyndhurst were similarly unproductive but one beetle was located at Matley sandpit. October visits to Brentmoor and Chobham Common in Surrey provided the opportunity to examine the habitat of the species at two of its known sites.

6. Invertebrates of flower-rich grassland

6.1 *Odynerus melanocephalus*

In 2005 Steven Falk studied populations of *Odynerus melanocephalus* on several post-industrial sites in Warwickshire and concluded that the sole prey of the wasp was the larva of the weevil *Hypera postica* taken from Black Meddick *Medicago lupulina*. In 2007 Adam Wright studied populations of the wasp on the Isle of Wight. The only prey items observed were again *Hypera* larvae but the species was not confirmed. Searches of food plants produced larvae only from Common Bird's-foot Trefoil *Lotus corniculatus* and none from *M. lupulina* or *Trifolium dubium*. In the same year Mike Edwards observed female wasps provisioning nests at Porth Neigle where *L. corniculatus* was the only host plant that could be found. This study originally intended for further samples of prey to be collected from sites in the Midlands as well as on the Dorset coast and around Salisbury Plain. However, local field

workers were not available to collect around Salisbury Plain so arrangements were made for Adam Wright to provide prey samples from the populations on the Isle of Wight. No prey items were obtained from either the Midlands or Dorset as populations were low or absent at the sites visited. Two nests in the Midlands that were excavated by Steven Falk in May were both empty but he did observe some hunting behaviour, always on lush and taller plants of *M. lupulina* with *H. postica* larvae. He saw no evidence of any other *Hypera* species or other *Hypera* foodplant being used. A strong population of *O. melanocephalus* was present at Roughlands, IOW (SZ3883) when Adam Wright visited the site on 4th, 17th and 18th June. One *Hypera* larvae was collected from a female wasp intercepted as she returned to the nest on each of the two earlier dates. Females were observed visiting *L. corniculatus* and *Hypera* larvae were collected from this plant for rearing and identification. Searches were made in the area for other food plants utilised by *Hypera* larvae. The nearest small patch of *M. lupulina* was found in a hard grazed field some 220 metres from the nesting area. The nearest Hop Trefoil *Trifolium campestre* was found in very small quantities 300 metres from the nesting area. Despite hand searching and sweeping, neither plant species yielded any *Hypera* larvae. The *Hypera* larvae from IOW, both prey and those collected from *L. corniculatus*, were photographed and both appeared to be the same species. The prey larvae were preserved but the others were reared. The resulting weevils were confirmed as *H. plantaginis*, a species normally associated with *L. corniculatus*. An additional visit to the site of an *O. melanocephalus* record at Alphamstone, north Essex failed to locate a population of the wasp.

6.2 *Cerceris quadricincta* and *C. quinquefasciata*

Adrian Knowles attempted to investigate the geographical variations in prey items taken by the digger wasps *Cerceris quadricincta* and *C. quinquefasciata*. Five locations in Suffolk and one in Essex were visited to search for nests of *C. quinquefasciata* on eleven days between 8th July and 28th August. Additionally the Ozalid Works site in Colchester was visited twice to search for nesting *C. quadricincta*. The sites were searched for signs of active female *Cerceris* wasps and for the cleptoparasitic Chrysid wasp *Hedychrum niemelai* in the hope that they might lead the observer to *Cerceris* nests. Although, from previous surveys, all of the sites were known to support the wasp, it was not possible to locate any nests of *C. quinquefasciata* during 2010. More worryingly, very few individuals of the species were actually seen. The inclement weather (frequent rain showers, unpredictable forecasts, cool and blustery conditions) during the survey period doubtless was the major contributor to this, but it is possible the cool, wet conditions in August the previous year might have had an adverse impact on this species. At the Ozalid Works site, the ability to capture *C. quadricincta* females returning to the nest is made difficult by the need to sweep them before they fly the wrong side of a chain link fence. The very small colony size means that very few individuals would be coming and going at any one time. No individuals were seen on either of the visits in 2010 and the long-term survival of the wasp here must be doubtful. The small nesting site is becoming engulfed by climbing vegetation growing through and along the overhanging chain link fence and the large area of adjacent brownfield foraging habitat (where other nesting aggregations may have occurred) is in the process of being cleared for

redevelopment. Jeremy Early reported that in a three year study of a small colony of *C. quinquefasciata* he had noted the prey differed each year with Gorse Weevils *Exapion ulicis* dominating one year, pollen beetles *Meligethes* sp. another and Bean Weevils *Sitona lineatus* another. Mike Edwards noted lesser variations in the prey of *C. quadricincta* at Pegwell Bay, Kent in 2004 and 2005. *S. lineatus* dominated both years but small numbers of the weevil *Ceutorhynchus pallidactylus* were taken both years and *C. obstructus* in 2005 also. *E. ulicis* was also taken from *C. quadricincta* at the Ozalid Works site.

6.3 *Colletes floralis*

Andy Jukes worked on a project to obtain information on the pollen and nectar resources and the habitat structure favoured by the bee *Colletes floralis*. Sandscale Haws National Nature Reserve (SD190749) was visited on two consecutive days in June (24th-25th) during sunny, warm conditions. A standardised walk and vegetation structure assessment survey was undertaken across the length of the site. The results show a range of vegetation structures and heights from bare ground and short turf through to expansive tussocky vegetation and tall scrub. Only one male *C. floralis* was observed during a preliminary walk of the transect. No other *C. floralis* were seen during the standardised walk. All pollen collection activity observed was centred on the previously studied area where there is a high density of Hemlock Water-dropwort *Oenanthe crocata* along a small stream. This location not only has a high density of flowers but is in a sheltered situation, ideal for pollen and nectar feeding insects. Analysis of the pollen loads from ten bees at this site shows that *C. floralis* appears to collect pollen regularly from an *Oenanthe* species, which here obviously must be *O. crocata*, from Rosaceae (probably a bramble or rose considering the time of year) and from Asteraceae (which could be Smooth Hawkbit *Crepis capillaris*). Occasionally it takes pollen of Sheep's Bit *Jasione montana*, another Apiaceae type and some species of Brassicaceae. Although no bees were observed on other flower species or types in the area of the *O. crocata*, it is apparent that *C. floralis* is utilising a wider range of species, with a strong emphasis on those associated with short turf and bryophyte cover.

Monitoring of *C. floralis* in Scotland continued under the Species Action Framework partnership that Hymettus has with SNH, RSPB and BBCT. Work in 2010 concentrated on establishing the range of the bee with a view to instigating monitoring at the edges of the range where monitoring could be carried out more easily and with more meaningful results. Surveys were carried out on Harris in July between Northton and Hushinish. Despite the presence of apparently suitable habitat in much of the west coast of Harris, *C. floralis* was not found anywhere. An interesting report from a crofter at Northton of mining bees in the past 1-2 years will be followed up. The apparent absence of *C. floralis* on Harris is puzzling, given its frequency on Berneray and its presence on Pabbay, both in the Sound of Harris, only 10km from good habitat at Northton. On the Berneray-Vatersay islands numbers and range appeared strong and stable.

6.4 *Lasioglossum angusticeps*

Research undertaken by George Else aimed to determine the nature of the pollen resources utilised by the bee *Lasioglossum angusticeps*. Burning Cliff, Ringstead Bay, Dorset (SY7581/7681/7781) was visited on June 4th and August 12th. The first visit was to establish the presence of the species, to locate nesting sites and to discover pollen sources. The second was to confirm if males occurred within the nesting area of the females (in order that both sexes could be associated as closely as possible) and if the pollen source may have changed over the course of the flight period. Analysis of 12 bees collected on June 4th showed 11 to have pollen loads that consisted entirely of *Lotus* grains. The only possible candidate species present in the site was Common Bird's-foot Trefoil *Lotus corniculatus*. The final bee carried no pollen whatsoever. Eight females of *L. angusticeps* from the collection of the Natural History Museum (BMNH) and the M. Edwards collection were found to carry pollen loads. Analysis of the pollen found that one bee collected by M. Edwards at Chideock, Dorset had two pollen grains of a smallish *Trifolium* sp. in amongst thousands of *Lotus*. This was probably accidental. As a result of studies made in 2010 the sole known pollen resource in Britain is apparently *L. corniculatus*. He has been unable to locate pollen records for the bee in mainland Europe or elsewhere within its world range. The species is tentatively regarded on available evidence as being at least narrowly oligolectic on Fabaceae and possibly even monolectic on *L. corniculatus* (though this would seem most unlikely given the bee's vast geographical range). Female *L. angusticeps* may visit flowers of other species of Fabaceae but this has not been confirmed. It would appear that availability of foraging resource is not a factor limiting the distribution of *L. angusticeps* in England.

6.5 *Eucera longicornis*

In May 2007 several specimens of the Long-horned Bee *Eucera longicornis* were observed on a patch of Yellow Archangel *Lamiastrum galeobdolon* in an orchard at Joan's Hole, Heightington (SO769703). The orchard contains old trees and in 2007 was overgrown with a rich flora and bramble patches. Geoff Trevis reports that since that time it has passed into new ownership. The brambles and much of the grassland has been cleared and the uniform grass sward suggests that it has been re-sown. The Yellow Archangel used by *E. longicornis* is no longer present though a few plants survive around the edges. The main flora is now buttercups and umbellifers (Hogweed *Heracleum sphondylium* and Cow Parsley *Anthriscus sylvestris*) though Ramsons *Allium ursinum* remains along the banks of the brook and there is some bramble and ivy. No *E. longicornis* were observed on any of seven visits to the site by Worcestershire recorders in June and July so it was not possible to confirm the pollen preferences of the bee as had been intended. The failure to find the target species could indicate that either the colony is now extinct or that the habitat changes in the orchard have caused it to change its foraging area. Possibly adverse weather conditions could also have had an effect if the orchard was at the limit of the foraging range. With these points in mind it was decided to extend the search area for potential nesting sites even though the flight period was over. Old House Farm and the adjacent Chapel Farm supported steep, sheep grazed pasture

which has not been ploughed or improved and carries the rich flora encountered near the orchard. Furthermore, there are many large and small land slips providing almost ideal nesting substrate for mining bees and wasps. Unfortunately, these later visits were outside the flight period of *E. longicornis* and the weather was cold and windy. Hymenoptera records were few. It was established that the fields on Old House Farm are in HLS. Permission for continuing access has been given. Elsewhere *E. longicornis* has been reported foraging on Meadow Vetchling *Lathyrus pratensis* from a number of inland locations, mainly across southern England but also in Warwickshire.

6.6 *Anthophora retusa*

Mike Edwards has been following up his work on the bee *Anthophora retusa* by negotiating the creation of new forage habitat through changes in grazing regimes at Cuckmere Haven, adjacent to the Seaford population of the bees. The aim of this is to assess the usefulness of such approaches in encouraging the bee to expand its range from its current restricted strongholds. Early site discussions with Richard James of the South Downs Joint Committee (soon to be replaced by the new South Downs National Park Authority) were very promising. It was agreed that approaches should be made to the tenant farmer to provide further areas of grassland which would not be grazed during March to July. This would replicate the very suitable regime (for both *A. retusa* and the BAP bumblebee *Bombus humilis*), which exists on the first field back from the shingle bank, provided by the same farmer. Also, there seemed to be a very real chance that a strip of suitable pollen and nectar mixture could be planted under an upcoming HLS stewardship for the National Trust land on the western side of the River Cuckmere as far as the White Horse. Political developments have since thrown into doubt all of these plans. Eastbourne Council have announced their intention of taking the land owned by them back into their direct control, but are unwilling to maintain the current level of conservation involvement, at least in the short term. This makes adjustment of grazing levels on the eastern side of the Cuckmere potentially less achievable as the farmer may not be supported in meeting a conservation objective at possible costs to his farming operation. This also threatens the currently agreed management of the field behind the shingle bar. On the positive side it is unlikely that these changes will affect the plans of the National Trust on the western side of the Cuckmere, unless the Stewardship Project is permanently affected in a negative way. Sussex Wildlife Trust has also offered to see if they can help ensure the development of suitable management in the area.

6.7 *Bombus distinguendus*

Work on the conservation of the Great Yellow Bumblebee *Bombus distinguendus* has continued under the Species Action Framework partnership that Hymettus has with SNH, RSPB and BBCT. Murdo Macdonald reported that a single database of all verified records of *B. distinguendus* since 1990 (excluding two erratic records of dispersing queens which failed to settle) has been prepared and is available to the public on NBN Gateway, managed by

RSPB. The first formal monitoring visits were carried out in 2010. Although there has been some turnover in the original volunteer teams, local coordinators have been satisfied with the teams they have. Results are being collated and analysed by BBCT personnel. The partnership will need to examine the first set of monitoring results when they become available to ensure that the methods are providing the type and quality of data required.

In Caithness a 750m² demonstration plot at Murkle Beach (ND166694) was planted in 2009 with c. 150 mixed species which included *Centaurea* sp., Kidney Vetch *Anthyllis vulneraria*, Red Clover *Trifolium pratense* and Field Scabious *Knautia arvensis*. In April 2010 the site was overgrown with rank grasses and the landowner allowed cattle to graze for a few days. No *B. distinguendus* was recorded on this plot in 2010 during four visits by one volunteer. Little progress has been made on the intention to link more closely the demonstration plots with SRDP. This is primarily because of the lack of resources within the Steering Group, and the failure to obtain additional funding from an HLF grant. Bob Dawson has worked a lot with the Caithness LBAP group and reported that 2010 was a **very** successful year, although the season was about two weeks later than last year. Many more people reported seeing, and are now more familiar with, *B. distinguendus*. Verified records came from many new locations, including two new 10km squares. There were more records in July than previously, helping our understanding of what flowers are important at this time in Caithness. A three-year pollen & nectar project was initiated by Caithness Biodiversity Group in partnership with BBCT. Monitoring was carried out by a dedicated team of volunteers, co-ordinated by Phyllida Sayles of CBG. As well visiting the plots themselves, *B. distinguendus* were recorded on agricultural Red Clover among “unharvested crops” sown under the SRDP, and occasionally in very high numbers. There was also a well-publicised series of records from Dounreay. The number of new sites discovered during this work was especially welcome, and confirmed a long-held suspicion that the bee was under-recorded inland in Caithness and Sutherland.

6.8 *Bombus subterraneus*

Work on the conservation of the Short-haired Bumblebee *Bombus subterraneus* has continued under the partnership that Hymettus has formed with NE, RSPB and BBCT. Over the winter of 2009/10 Nikki Gammans was in New Zealand working with local individuals with experience in raising bumblebees for commercial applications. Queen bees were captured on emergence from hibernation and were persuaded to nest. Only a small number of established nests produced new queens and males in February/March. Three of the six queens were mated with brothers from the same colony. The other three queens were mated with different males from different colonies. The newly mated queens were then placed in hibernation. Then workers, males and old queens were shipped in liquid nitrogen to Mark Brown at Royal Holloway for screening for all of the known bumblebee diseases. Only queens from clean nests which mated with clean males could be brought to the UK. These queens were due to be imported in June for a well-publicised release at Dungeness. Unfortunately, all six queens were found to be dead at the end of May when they were

checked prior to final shipment. However, the work to improve habitat in the area ahead of the eventual release has already had a positive effect on populations of other species. The measures have included establishing pollen and nectar-rich field margins, growing Red Clover *Trifolium pratense* hay meadows and rotating grazing of animals on land. The Shril Carder Bee *Bombus sylvarum* has been seen in areas where it has not been recorded for 25 years.

6.9 *Bombus ruderarius*

Paul Lee has been attempting to discover more about the habitat requirements of the Red-shanked Carder Bee *Bombus ruderarius*. The vegetation structure at a sample location was to be assessed using the concept of functional ecological surfaces developed by Natural England for CSM. Within the sample area the male *B. ruderarius* would then be counted. On the initial visit to the King's Forest, Suffolk on 26th July it soon became apparent that the planned approach was not going to be successful. The population of *B. ruderarius* was too sparse for the transects to detect them. The only *B. ruderarius* observed on this visit were at the car park at Rampart Field (TL788715), late in the afternoon, after the sampling had been abandoned. Four males were nectaring on thistles in breck heath at the edge of scrub. To make more efficient use of the remaining time allocated to the field work it was decided to try to locate *B. ruderarius* colonies first and then record the vegetation structure. Sites in south east Suffolk were targeted to reduce travelling time. On 30th July and 2nd August six sites were visited at Flatford Mill, Freston, Lower Holbrook, Tattingstone (Lemons Hill and Larch Wood) and Wherstead. Although *B. ruderarius* had been recorded from both Flatford Mill and Lemons Hill in previous years, no specimens of the bee were seen in 2010. Insufficient data has been collected to be able to achieve the aim of the project.

7. Invertebrates of East Anglian wetlands

7.1 *Odynerus simillimus*

Tim Strudwick has continued to search for and monitor *Odynerus simillimus* colonies in Norfolk and Paul Lee has monitored the most recently discovered colony at Cattawade on the Suffolk/Essex border. The weather in 2010 was favourable for *O. simillimus* through June and into mid-July. Thereafter it became cooler and unsettled, and for most of August was particularly cold, and frequently wet and blustery, though rarely without sunshine for more than a couple of days. Field visits were made to count nests and monitor wasp activity at the known sites at weekly intervals from June through into August. A new colony was discovered by chance at Martham Broad and this was also visited weekly from 8th July onwards. The earliest observations of active wasps in 2010 were on 17th June both in Norfolk and at the Cattawade study site. Active nests were also observed at Hickling Broad North and at Cattawade suggesting the first emergence dates may have been missed. Conditions at

Cattawade had been dry but maximum temperatures were only in the high teens during the week before these observations. Peak nest counts in 2010 also coincided in Norfolk and Essex/Suffolk during the first week of July. While conditions remained dry, temperatures at Cattawade were climbing through this period reaching a peak of 30°C on 9th July. At both locations there was a rapid decline in the number of nests recorded from mid-July no doubt reflecting the effect of the deterioration in the weather on wasp activity. Frequent, and often heavy, rainfall probably also led to an underestimation of the number of active nests present due to rain washing away chimneys. The numbers of nests recorded in 2010 was much greater than in the previous 3 years, and though the increased survey effort may account for part of this, there was clearly a real increase in population at Hickling Broad North and Sutton Broad at least. Early in the season, when visits were made in warm, sunny weather, many males were observed around the nesting areas, often in small groups. Though no mating was observed it seems likely that in common with many other Hymenoptera male *O. simillimus* encounter females and mate in the vicinity of the nests. This is contrary to the suggestion in a previous report that mating may occur at nectar sites. The initiation of a nest and the method of construction were observed on several occasions. No observations were made of a completed nest being sealed, but it was clear from weekly observations that no trace was left of most, so it is assumed that the chimney is dismantled. At the end of the season a proportion of nests were left open, presumably due to the female wasps perishing before they were able to complete and seal them. Nests were mainly located on level areas or shallow south, south-east or east facing slopes, and on banks were most often within 50cm of the top. If on the top of the bank they were generally close to the eastern or southern edge, and often on slightly raised areas, such as the soil pushed up at the edge of wheel ruts. No nests were found on north facing slopes, level ground at the bottom of slopes or on nearly vertical faces. Though soils of varying type were used, there was a clear preference for soils that did not shrink, crack or crumble on drying, presumably those with a significant clay content. These were generally sandy or silty clays, and nests were sometimes concentrated in small patches of such soil amongst large areas of pure silt or peaty soils. Even in areas of apparently uniform soil type, wasp nests were clearly clumped. This may be due to the tendency, where nest habitat remained suitable between years, for wasps to nest in the immediate vicinity of their natal nest. It seems likely that if the natal nest site is no longer suitable, usually due to development of tall shading vegetation, the female wasps dispersed to new sites. The observations of nest abundance at two recently constructed banks at Hickling and Martham show how quickly the wasps can colonise new sites and the potential rate of increase in new colonies.

7.2 *Asindulum nigrum*

David Gibbs started a project to determine the environmental and ecological factors characteristic of sites inhabited by the fungus gnat *Asindulum nigrum* and to investigate the conditions necessary for nest establishment and egg laying. Historical records for *A. nigrum* are concentrated in East Anglia (11 sites), the remaining scatter of sites being in Somerset, Hampshire, Oxfordshire and one in Ireland. Geldeston Meadows (TM396917),

Woodbastwick (TG3316), Upton Broad (TG3813) and Mills Marsh (TG362155) were identified as sites that both had suitable habitat remaining and were close enough that all could be visited in a short period. However, Mills Marsh was only accessible by boat and Strumpshaw Fen RSPB reserve was substituted. Despite there being no records from this site, information available suggested the habitat would be suitable. Woodbastwick was visited on 12th July. Rain prevented use of a sweep net so searching depended on disturbing flies from the vegetation and spotting them and doing extensive hand searches amongst vegetation. At about 11.00am, a single female *A. nigrum* was disturbed from the fen vegetation alongside a path and netted. This and many similar areas were searched for the rest of the day without finding more *A. nigrum*. Thus it is not possible to decide if the single observation was good fortune, or if they are frequent in this area but too deep in the vegetation to be readily found due to the very poor conditions. As field work was delayed and much hampered by the wet weather on 12th July, the whole day was spent at Woodbastwick. Upton Broad was visited the next morning when weather conditions were much improved, but still overcast and relatively cool for July. The vegetation was dry enough to use a sweep-net after about 10.00am. Very extensive areas of habitat that looked good for *Asindulum* were searched and several hours spent sweeping. No *Asindulum* were found strongly suggesting that the species, if present here, is very scarce indeed. The only other possibility is that the flight season this year was over and the Woodbastwick individual had emerged unusually late. The afternoon was spent at Strumpshaw Fen where extensive areas of flower-rich water meadows along the River Yare were searched. Weather conditions were dry, although still cool for the time of year. Four large meadows were searched with almost continuous sweeping but no *Asindulum* were found. There was no time to visit Geldeston Marshes.

7.3 *Dolichopus laticola* and *D. nigripes*

Martin Drake has been attempting to determine the hydrology, vegetation structure and management regime characteristic of sites inhabited by the flies *Dolichopus laticola* and *D. nigripes*. Dolichopodidae were sampled at six fens in Norfolk's Broadland, three at the north end of the Ant valley (Barton, Sutton, Catfield Great Fen) and three on the Bure (Woodbastwick, Horning Marsh Farm, Ebb & Flow), using timed sweep-net samples. A suction sampler was tried but was abandoned since almost no large species of flies were caught. Within a discrete vegetation type, a sample was taken after walking a randomly selected number of paces in the direction of some conspicuous object, such as a bush or tree on the horizon. This was the nearest rapid approach that could be made to taking a random sample within each stratum (in the statistical sense). The samples were therefore not strictly random but were probably indistinguishable from random, and this method had the advantage of being rapid, safe and workable in difficult terrain. Vegetation structure, soil wetness, tussocks, management of fen vegetation, the approximate time since any ditch had been cleaned and the type of fringing vegetation were measured / scored at each sampling point. Sampling took place on 10 consecutive days 20-29 June when the weather was almost constantly fine. Seventy species of dolichopodids were recorded from 179 samples. *D. laticola* was the fifth most frequent species of dolichopodid and the second most frequent of

21 species of *Dolichopus* recorded. *D. laticola* was found at all six fens. It was more frequent in the Ant fens than in the Bure fens. *D. nigripes* was the thirteenth most frequent species in the family and seventh most frequent species of *Dolichopus*. *D. nigripes* was found at three fens but was frequent only at Woodbastwick Fen. Both BAP species were therefore important constituents of the family in the fens. *D. laticola* showed a preference for reed-dominated fen vegetation and was also frequent at the short open vegetation of paths and tracks. *D. nigripes* showed a preference for the short open vegetation of paths and apparent avoidance of reed-dominated vegetation. Both species avoided sedge, carr and old tall scrub. The relationship between the two BAP *Dolichopus* and other species was examined using DECORANA. Both species were associated with other dolichopodids that are known to be fenland specialists. More analysis will be undertaken using the environmental variables, and for this generalised additive modelling is considered most appropriate since the statistical distribution of the data preclude parametric methods such as linear regression. It is thought that soil wetness and perhaps the abundance of reed may well show a good correlation with the distribution of *D. laticola*, but the limited geographic spread of records for *D. nigripes* may make it impossible to discern any trends with the variables.

8. Invertebrates of open woodland

8.1 *Chrysis fulgida*

Scott Dodd is attempting to determine the current English distribution of the jewel wasp *Chrysis fulgida*. He has constructed suitable traps and three were set at each of nine locations across Surrey, north Hampshire and Dorset to attract the hosts of *C. fulgida* for nesting. The traps have now been collected in for overwintering. The presence of the wasp on these sites cannot be gauged until the adults begin emerging next year.

8.2 *Formica rufa* and *F. lugubris*

Elva Robinson has been investigating the status of the wood ant species *Formica rufa* and *F. lugubris* in the midlands and north of England. The survey focussed on breadth of coverage of wood ant populations (72 sites) and this necessarily came at the expense of detail about any one population. For both species, 60-70% of historical records were confirmed. The details of the picture differ however. The overall pattern seems to be that *F. rufa* is struggling at the northern edge of its range, while *F. lugubris* is doing well at its southern range edge. This view is at odds with the general climate-change driven pattern of species shifting their distributions north, as conditions become more clement. This may suggest that local weather patterns, habitat fragmentation and habitat loss are more significant drivers of extinction for wood ants than overall changes in climate. It may also indicate that *F. lugubris* are better climatic generalists, adapted to survive poor weather, but tolerant of warmer spells, whereas

F. rufa may be better adapted to warmer climes, but more likely to be injured by periods of adverse weather. There was no evidence that either species is competitively excluding the other. In almost all cases, the species identity (*F. rufa* vs. *F. lugubris*) was the same in the historical record as in this survey. The two exceptions were almost certainly the result of misidentifications. Nests from 16 *F. rufa* populations were sampled for *Formicoxenus nitidulus*, but only one of these gave a positive result (Gait Barrows, West Lancashire). Nests from 27 *F. lugubris* populations were sampled, and *Fx. nitidulus* was found in four of these. This low recording rate should not be taken to indicate a correspondingly low incidence. *Fx. nitidulus* has been recently recorded at several of the populations visited and yet was not found during this survey, which gives an indication of the difficulties in finding this species. Almost all the populations surveyed appeared to be healthy, in so far as multiple nests were present, these nests well-maintained by their inhabitants and numerous foragers were evident. Due to the lack of detail in most of the historical records with which to compare the current survey results, it was not possible to assess changes in population health. Detailed longitudinal studies of the size and vigour of wood ant populations which can be used for comparisons in future are required.

8.3 *Crossocerus palmipes*, *C. styrius* and *C. walkeri*

George Else continued his investigations into the nesting and foraging requirements of *Crossocerus palmipes*, *C. styrius* and *C. walkeri*. During the period from early July to the beginning of September 2010 eleven days were spent visiting thirteen localities in Hampshire and Surrey. One or more of the three target species had previously been confirmed from most of these sites. Four collecting methods were employed at each site visited: investigation of exposed sand for nest burrows (*C. palmipes* only), sweeping sun-lit vegetation, examination of rotten wood (for possible nest sites) and inflorescences (especially Apiaceae). The only site where one of the target species was encountered was Royal Common, west of Milford, Surrey (SU922425). On 24th July a female *C. palmipes* was collected flying low over a sandy exposure on one of the footpaths. It was a warm sunny day but cloud built up throughout the morning to the extent that later in the day there were only frustratingly short glimpses of the sun that reduced aculeate activity. The site was revisited on 28th July in an attempt to assess the local population of the wasp and to see if nests could be located to study the nesting behaviour (including the identity of any prey brought in by returning females). However, the weather conditions were not very propitious, being very similar to those experienced on the previous visit and no further sightings were made. Mike Edwards collected a male *C. palmipes* at Shalford Meadow, south of Guildford, Surrey (at rest on a *Alnus* leaf beside the River Wey) (SU990456), on 8th August 2010. It was very surprising not to find *C. walkeri* at Leckford, in an area in which it had been seen many times in the past. It was certainly not a good year for *Crossocerus* or indeed many other aculeate wasps, the season was the third consecutive one when weather conditions were ideal in the spring and early summer, but deteriorated from July onwards. The three late summers were characterised by overcast, cool and often very wet periods. This in itself may not have adversely affected many *Crossocerus* species, as most have long flight periods, possibly the result of being at least bivoltine. Some

are active from May to late September and even October, but poor conditions for nesting from mid-summer onwards would not have been conducive to their reproductive success. Stuart Roberts reported that continental work indicates that *C. walkeri* tended to nest in dead wood relatively high up in the canopy but had no information on whether conifers or broadleaves were utilised. There is no evidence that *C. palmipes*, *C. styrius* and *C. walkeri* are declining in Britain and the adults are so rarely encountered that it would be difficult to investigate such a decline without a reliable method of detecting their presence.

8.4 *Andrena ferox*

Female *Andrena ferox* appear to forage almost exclusively for oak pollen but oak woodland is a common habitat so why is the bee so restricted? One factor might be that oaks in certain sites do not flower over a long enough period to enable the bee to collect sufficient pollen to provide for her brood. If the flowering period of all the oaks in a particular area was highly synchronised then the bee might not be able to provide for sufficient brood to maintain the population. This might occur if all the oaks in an area have very little genetic diversity, such as in an even-aged plantation. This hypothesis was tested by Mike Edwards in 2008. He compared the flowering of oaks in the New Forest (where there is a relatively large population of *A. ferox*) with woodlands in West Sussex, an area where *A. ferox* was unknown. The conclusion was that there was no clear evidence of a significant difference between the flowering period of oaks in the New Forest and the West Sussex woodlands. In 2010 Graham Collins attempted to apply Edwards' methodology to oak woodlands at sites in Surrey and East Kent. Four sites in each county, 2 control sites and 2 where *A. ferox* had been recorded (Pluckley, Kent in 1968 and 2001 and Reigate, Surrey in 1998) were surveyed along a transect comprising 30 mature trees. The stages of development of the trees and their flowers were assessed three times at one week intervals between 6th May and 21st May. No clear evidence of suitability or unsuitability for *A. ferox* was shown between the sites. At sites at which *A. ferox* has been recorded there might have been a longer flowering period of oak than on sites where the bee was absent, but a further visit after another week would have been needed to confirm this as the survey was completed before flowering was completely over. Some trees produced copious catkins and relatively few leaves while others produced many leaves but very few catkins. This may be further evidence of genetic diversity, although it is not known whether trees that are "heavy" catkin producers do so every year. While lack of genetic diversity may be reflected in synchronisation of flowering period, it is probable that factors such as site aspect and woodland structure are important too.

8.5 *Philorhizus quadrisignatus*

John Walters is attempting to characterise the micro-habitat of the carabid beetle *Philorhizus quadrisignatus*. Bushy Park, Middlesex was visited on 13 October to search for *P. quadrisignatus* as it is the only British locality where the beetle has been found reliably in recent years. Four hours spent searching under bark of hawthorns and other trees produced no

specimens. A visit to Deadman's Hill in the New Forest two days later also failed to produce the beetle. This is another difficult beetle to study as its ecology is so poorly understood. It may be for example that it occurs high in the canopy of trees and is rarely found. Discovering how to locate it most effectively is a priority before searches can be made more widely; the technique of searching under bark is destructive so alternative methods of finding the beetle need to be investigated e.g. searching tree trunks after dark by torchlight.

9. Development of Hymettus Ltd.

9.1 An Annual Report and accounts for the year from 1st April 2009 to 31st March 2010 have been prepared for submission to Companies House and the Charity Commissioners as required by law. The report stated that:

During 2009/10 the company has continued to initiate and progress a number of projects to ascertain the habitat and forage requirements, distributions and genetic diversity of some uncommon and threatened species of aculeate hymenopterans (ants, bees and wasps). Information obtained in the course of research has been widely disseminated through publications, through the company's website and through direct contact with other researchers and land managers.

Partnerships continue to be seen as an important means of achieving the company's objectives. Hymettus is working in partnership with Bumblebee Conservation Trust, Natural England, RSPB, Scottish Natural Heritage and Surrey Wildlife Trust on several ongoing projects. In addition working relationships continue to be built with academic institutions both to provide support to students and as a partner in successful research bids. Hymettus has led a partnership involving several voluntary biological recording organisations in submitting a bid to Defra for biodiversity research funding that would run until 2012.

9.2 The financial support provided by the Esmee Fairbairn Foundation has now ended and alternative sources of funding are constantly being sought. Hymettus is actively seeking to work with new partners including commercial organisations, academic institutions and other non-hymenopteran interest groups. The Hymettus led bid referred to above was successful and will form a substantial proportion of the organisation's work in 2011.