Action for Biodiversity

Hymettus

Supported by the Esmée Fairbairn Foundation

Hymettus Ltd
Research Report for 2009

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Contents

Hymettus Report for 2009

1. Background to 2009 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. This work was made possible by core funding from the Esmée Fairbairn Foundation and research funding through a Memorandum of Agreement with Natural England. Other projects reported here were financially supported by the Cairngorms National Park Authority, the Countryside Council for Wales, Heritage Lottery Fund, the People's Trust for Endangered Species, RSPB and Scottish Natural Heritage.

1.2 Projects undertaken in 2009 are reported in the following order of taxonomic group: ants, wasps, bees, other projects. Many of the reports submitted are only summarised here but the full reports can be obtained from Paul Lee and many can be downloaded from the Hymettus website.

2. Ant Projects

2.1 *Formica exsecta*

2.1.1 A nest count on the Chudleigh Knighton site was carried out between 22nd and 30th August 2009 by Stephen Carroll. The methodology developed by Dr D. Stradling for previous surveys was followed as closely as possible. Criteria for interpretation of new nests were more rigorous than for previous surveys since 2005; new nest numbers were attributed only where nests were at least 5m away from a known existing nest, taking into account directional movements from previous years, otherwise the possibility that new nests were satellites of existing nests could not be ruled out. Consequently results for 2009 show relatively higher numbers of inferred satellite nests to new nests (24 of 38 new nests discovered in 2009 were within 5m of pre-existing known nests, and hence recorded as inferred satellite nests). A total of 52 previously known active nests were found, plus 14 new nests recorded (total 66 nests), with an additional 52 inferred satellite nests.

2.1.2 Twenty one artificial 'stumperies' were set up during the year after discussions with site managers Devon Wildlife Trust (DWT) and volunteers. Twenty two existing tree stumps, from previous management operations, and one felt reptile mat, were also identified for future monitoring. Composition and locations were partly limited by available materials, labour and access. Scots Pine *Pinus sylvestris* and Silver Birch *Betula pendula* stumps, approximately 1m in length and 20cm+ diameter, were used, cut from nearby Bovey Heathfield during 2005-8 as part of routine management operations. Supplementary Silver Birch was sourced from Chudleigh Knighton during the volunteer days. Apart from cutting to size, no further treatment was carried out on stumps. Bark was retained. To increase the surface area of stumperies, stumps were buried in roughly circular clumped groups of 5-6 stumps, to a depth of approximately half their height, mostly upright, comprising mixed species. Locations were selected that were open (but not obstructing access for machinery operations), more than 15m from existing nests and stumps,

free from waterlogging, and with taller vegetation to one side to allow for foraging and shelter from the prevailing wind. All locations were GPS recorded.

2.1.3 Stump piles and existing tree stumps were monitored for signs of colonisation by ants. No stumps had been colonised by *F. fusca* or other species by the time of survey, though stumps had been in place for a short while only at this point. A *F. fusca* nest was discovered under the reptile mat.

2.1.4 Information was received from site managers DWT regarding previous swaling (burning) on Chudleigh Knighton from 2007-present. No swaling was undertaken in 2009, though firebreaks were mown and some scrub cutting was carried out. Management has been combined with grazing in most cases except in an unfenced woodland glade. Managed areas were investigated for signs of ant colonisation by *F. exsecta* and *F. fusca*. From preliminary results there is a suggestion that a new *F. exsecta* nest found in one management compartment in 2008 was established in an area swaled the year previously. However it is not known for certain whether this nest pre-existed that management. One other nest in the area swaled in 2007 was recorded as lost in 2008. Two new *F. exsecta* nests and new satellites from an existing *F. exsecta* nest were found in a mown compartment. This was the first season of monitoring and areas managed since 2007 conceivably have not succeeded to suitable conditions for colonisation as yet.

2.2 *Formica rufibarbis*

2.2.1 The Heritage Lottery Grant for work towards the conservation of *F. rufibarbis* in Great Britain has now run its term. Natural England provided funding in 2009 and has been continuing work with the Isles of Scilly and Surrey Wildlife Trusts, Hymettus and myrmecologists Dr John Pontin, Dr Nicola Gammans and Dr Ian Beavis in planning and coordinating actions for the protection and recovery of this species.

2.2.2 John Pontin has expressed concern that the queen ant in what was long considered the last remaining nest on Chobham Common may be dead. No pupae were observed in the nest in 2009 but John will continue to monitor the situation. The newly discovered roadside nest was potentially threatened by replacement of the gas main in the verge. National Grid agreed to emply Scotty Dodd to be present on site when work commenced. Prior to any work commencing the colony relocated about 3m further onto the Common, the area was cordoned off and plant operators were alerted to the situation.

2.2.3 Monitoring of the 2008 nest release sites produced just one foraging worker on Burnt Hill (SU968 663). There was no evidence of ants at Staple Hill (SU973 647). A further thirty workers were released on Burnt Hill in July.

2.2.4 Over wintering at ZSL of the ants collected from the Scillies in 2008 produced one queen for release at the Monument site in May 2009. A further eight queen ants were clinically screened on 26th June 2009 prior to transfer to Chobham. Six of these ants were transferred for release but two were retained at ZSL for further monitoring. No infections were detected and all parasites cultured from the ants are considered native. Screening of 181 workers of six ant species (including 30 *F. rufibarbis*) collected from Chobham was undertaken on 12th June 2009. There was no evidence of clinical disease in any of the species populations.

2.2.5 Field work on the Scillies in 2009 was carried out by Sam Jones, an MSc student. Whilst studying the ecology of the species on St Martins he collected a further 18 queens for translocation to Chobham. Colonies were built up with worker pupae by Scotty Dodd and John Pontin before any were released. Scotty Dodd later released eight colonies each with at least 30 workers at Tank Hill and John Pontin released a further five colonies near Monument. A total of 13 colonies were retained for release in spring 2011. The south facing side of Monument hill has been earmarked for future releases and habitat management including some tree clearance will be undertaken. The Tank Hill scrapes are in good condition for *F. rufibarbis* and have low populations of other ant species.

2.2.6 Some of the remaining HLF funding was allocated to further genetic comparison of the mainland and Scilly populations of *F. rufibarbis*. The study was extended to continental populations notably in France and Germany. This work suggests that the Surrey population is more closely related to ants in France and Germany than to those in the Scillies.

2.3 Southern ants project

2.3.1 Dungeness

Brian Banks continued to study the ants at Dungeness through the summer of 2009. He will update us on his findings at the review meeting.

3. Eumenid Wasp Projects.

3.1 *Odynerus melanocephalus*

3.1.1 No further autecological work or distributional surveys were undertaken for this species in 2009.

3.2 *Odynerus simillimus*

Further monitoring of *Odynerus simillimus* populations in Essex and Norfolk was undertaken in 2009. Tim Strudwick coordinated further studies in Norfolk and David Scott continued to monitor the Essex population.

3.2.1 Norfolk

An information sheet was drafted in June 2009 and distributed, mostly by email, to staff of all the main conservation bodies and other agencies involved in land management in Broadland and to a few individual landowners during late June and early July. The information sheet generated two possible reports of the wasp, which proved to be other species and, more usefully, several reports of areas of potential nesting habitat, many of which were checked. It was unfortunate that *O. simillimus* activity peaked particularly early in 2009 and nesting activity seemed to cease about three weeks after the information sheet was released. A lot of interest in potential conservation measures was generated and there was much enthusiasm to look out for the species in 2010.

3.2.2 Fieldwork involved visits to sites not previously surveyed. These were identified from discussion with staff from other organisations in the Broads or from inspecting recent (2005-2007) aerial photographs. Surveys were restricted to the Thurne and Ant valleys where all previously known sites are located. Some known sites were also visited. Visits were primarily aimed at locating nests and no attempt was made to choose days with warm, sunny weather. However, all visits were preceded by 3-4 days in which there was no heavy rain (which may destroy nests) and some warm, sunny weather (to promote nesting activity). An RSPB volunteer (Tessa Needham) was trained to survey for nests at the Sutton Fen RSPB site, enabling more frequent observations to be made here. Visits were made on seven dates from 18th June to 19th August.

3.2.3 A minimum of 59 active nests were found at 10 locations. Seven of these were new sites though all were within 1.5 km of previously occupied nest sites. Abundance appeared to be greater than in 2008, and activity was early than in most years with active nests present from 18th June to 23rd July.

Table 1: All records of *Odynerus simillimus* nests and adult wasps recorded during this survey.

Site	**Grid ref**	**Date**	**Active nests**	**Adults observed**
Sutton Fen RSPB	TG37192381	18/06/2009	2	
Sutton Fen RSPB	TG37192381	30/06/2009	17	6f
Sutton Fen RSPB	TG37192381	08/07/2009	3	
Sutton Fen RSPB	TG37192381	14/07/2009	3	2f
Sutton Fen RSPB	TG37192381	23/07/2009	1	
Hickling Broad NWT North	TG42152199	08/07/2009	10	1f
Hickling Broad NWT North	TG43152161	08/07/2009	1	1f
Hickling Broad NWT North	TG43272155	08/07/2009	2	
Hickling Broad NWT North	TG43522139	08/07/2009	1	
Hickling Broad NWT North	TG43442147	08/07/2009	1	
Hickling Broad NWT North	TG43462150	08/07/2009	2	
Hickling Broad NWT West	TG40522152	08/07/2009	13	
Hickling Broad NWT West	TG40522157	08/07/2009	2	
Hickling Broad NWT West	TG40442158	08/07/2009		1m
Hickling Broad NWT West	TG41112124	08/07/2009	1	

Table 2 shows additional sites in the Thurne Valley that were visited to look for potential nest sites and search for nests. No nests were found at these sites.

Table 2: Additional sites visited in the Thurne valley in 2009

Date	Site	Comment
8th July	Hickling Staithe	
8th July	Hickling Heath	Bank probably too shaded
23rd July	Martham Broad South bank	Floodbank works completed July 2009; abundant bare ground
23rd July	Hickling Hall	Little nesting or forage habitat
23rd July	Stubbs Mill	Suitable nest habitat on spoil bank near pumphouse

The peak count of 17 active nests was made on 30th June. On this date 45 minutes were spent in hot sun observing the wasps coming and going at the main aggregation of 14 nests. In this time 6 or 7 wasps returned with prey and quickly entered their nest holes, most leaving again within 1 or

2 minutes. Even if not all nests were being actively provisioned, this suggests a rather low provisioning rate and possibly a low reproductive rate.

Table 3 shows additional sites in the Ant Valley that were visited to look for potential nest sites and search for nests.

Table 3: Additional sites visited in the Ant valley in 2009

Date	Site	Comment
10th Aug	How Hill	Some potential nest habitat along riverbank path.
10th Aug	Catfield Fen	Some potential nest habitat on spoil by car park
10th Aug	Barton Fen	No nest habitat found but prime foraging habitat.

3.2.4 The observations have supported what is already known about the ecology of this species. There were however a few observations that deserve further comment and discussion. The only observation of a wasp away from the nest was of a male which loitered on the same tufted vetch plant vetch for an hour without feeding, though he was clearly able to fly. This raises the possibility that the males find their mates at vetch. Females were observed on at least six occasions loitering in burrows, their faces visible about 1cm down into the burrow. The circumstances were always on overcast days or before about 10.30 hours. Some of these burrows had no evidence of a chimney, possibly suggesting they were freshly emerged individuals.

3.2.5 Soils at nest sites vary immensely and at some sites used in the Broads soils are very sandy, though there is always a tiny component of clay or fine silt that allows the dried soil to stick together. There is certainly no need for a predominantly clayey soil. *O. simillimus* is clearly able to colonise recently disturbed substrate. Spoil banks created in March 2009 within the reed-dominated fen at Hickling NWT reserve had been colonised by early July 2009. The new flood defence bank nearby, constructed in autumn 2008, supported a number of nests in 2009. Observation of the variation in nest grouping suggests that dense aggregations are probably the result of the growth of a colony over a number of years. Where new habitat is colonised, scattered nests are likely to be the norm. Where habitat is short lived, aggregations may not develop making nests harder to locate. Grazing is certainly a positive influence, maintaining suitable nesting conditions with more continuity than mechanical operations, so the continued growth of conservation grazing in the area gives grounds for optimism for the species' status. Potential conservation management and habitat creation opportunities were discussed with Broads Authority, Broads IDB, Norfolk Wildlife Trust, RSPB and Natural England and some experimental work is likely to be carried out during winter 2009/10.

3.2.6 There is clearly some variation in timing of flight activity from year to year. The peak in nesting activity in Broadland in 2009 was the first week of July, and records from Essex in 2009 indicate similar timing, though there were some later records. It is possible that June/July is a more typical active period than July/August, so targeting fieldwork earlier in this period may be advisable.

3.2.7 The seemingly low rate of provisioning observed, if typical, may help explain the seemingly poor ability of *O. simillimus* to colonise suitable habitat and extend its range. This may also point to variability in prey populations – we judge habitat by the presence of the prey's food plant, but we know almost nothing about the prey population. Here are two potential areas for further study.

3.2.8 Essex
Four sites where *O. simillimus* had been observed nesting in previous years were revisited in 2009. Alresford Creek (TM073192) was visited on five occasions between 18th June and 17th August. Up to 12 or 13 nest chimneys were found on any one visit. A pond 150m east of the site now contains a good growth of *Apium nodiflorum* and one *Hypera* cocoon was seen here. The site near Brightlingsea sewage works (TM068173) was visited on 18th June and 25th August. A maximum of five chimneys were seen. The sites around The Ford at Alresford Creek (TM064197) were visited in July and again on 12th August. Up to ten possible chimneys were seen on the sea wall 150m to the east of the cottage and further nests were seen to the west. Wasps were observed at both locations. No nests were found in the edge of the ploughed field where the wasp has nested in previous years. A good *A. nodiflorum* population was present in a fresh water ditch behind the sea wall. Howlands Marsh (TM1116) was visited on 7th July, a warm, sunny day. One or two female wasps were seen hunting on *A. nodiflorum*. *Hypera* weevils were abundant on *Apium* in the eastern boundary ditch. *A. nodiflorum* was absent from the main drain running therough the site. The only chimney found was on a sandy path in the extreme north east corner of the nature reserve.

3.2.9 Visits to new locations drew a blank along the lower tidal reaches of the Roman River (TM0322) but a new colony was located at the Cattawade RSPB reserve (TM09753310). This latter site is on the northern bank of the Stour estuary, just inside Suffolk. Several wasps and up to 15 nests were observed on 10th July. No source of weevils has been located as yet.

3.3 *Pseudepipona herrichii*
3.3.1 No further autecological work or distributional surveys were undertaken for this species in 2009.

4. Chrysidid Wasp Projects

4.1 *Chrysis fulgida* and *Chrysura hirsuta*
4.1.1 No further autecological work or distributional surveys were undertaken for these species in 2009.

5. Pompilid Wasp Projects

5.1 *Homonotus sanguinolentus*
5.1.1 No further autecological work or distributional surveys were undertaken for this species in 2009.

6. Sphecid Wasp Projects.

6.1 *Cerceris quadricincta* and *Cerceris quinquefasciata*

6.1.1 No further autecological work or distributional surveys were undertaken for these species in 2009.

6.2 Crossocerus palmipes, Crossocerus styrius and *Crossocerus walkeri*

6.2.1 George Else and Stuart Roberts were involved with autecological studies of the three *Crossocerus* species - *palmipes, styrius* and *walkeri*. George Else compiled lists of all known records of *Crossocerus palmipes, styrius* and *walkeri*, based on both literature sources and material in private and national collections. This included studying specimens of all three species, collected in the UK and elsewhere in Europe, that are present in the Natural History Museum, London, and loaning those in the care of the Royal Scottish Museums, Edinburgh. All specimens were carefully re-identified (this was important as, for instance, a number of *C. palmipes* purporting to have originated in Scotland were in fact misidentifications). Three distribution maps (one per species) have been produced from the resulting records effectively updating the maps already published in the Bees, Wasps and Ants Recording Society's atlases. In order to discover as much as possible about the life-histories and habits of the three species, literature references, including many that were published in mainland Europe, were sought out.

6.2.2 *Crossocerus palmipes* is an elusive and scarce species. The extreme modification of the male's fore tarsus in this wasp is a useful identification feature in the field, though this is not present in the female. The species nests in the soil.Weavers Down, Liphook, north Hampshire and Bagmoor Common, Milford, Surrey were searched unsuccessfully for this species.

6.2.3 *Crossocerus styrius* is clearly a rare species everywhere. In common with a few other *Crossocerus* species, this wasp is regularly bivoltine, with records continuing into the late summer. Females prey on Diptera and nest in the ground. Many records involve specimens alighting on low vegetation with dappled sunlight. Attempts to find this wasp were unsuccessful.

6.2.4 *Crossocerus walkeri* is a scarce though widely distributed riparian species. Modern sites are few in number. The species nests in burrows in dead wood, such as branches, and provision its cells with both Ephemeroptera (mayflies) and Diptera. Nests, as with many *Crossocerus* species, are rarely encountered. However, the wasp has been reared quite recently from sites in Scotland and East Anglia. In the Royal Scottish Museums (Edinburgh) there is a specimen of one of these and this is accompanied by a large gelatine capsule crammed full with prey remains recovered from a nest. Attempts to find this wasp were unsuccessful.

6.2.5 In addition to this work, Adrian Knowles attempted to locate a population of *C. walkeri* in the Brecks near Thetford following the recent identification of a specimen collected there in 1996. Arthur Watchman collected the specimen during an organised trip to Thetford Heath at RAF Barnham. This MOD establishment has secure boundaries, with special permission needed to access the heath. The location of the specimen is given as TL 8580. This map square lies fully within the MOD land perimeter and comprises a mosaic of Breck grassland, scrub and conifer plantations. There is no fresh water within the site, but it lies only about 1 km west of the Little Ouse River. This is a good quality river that would appear to be the obvious source of mayfly

prey, separated from the capture site by Barnhamcross Common SSSI, another mosaic of Breck grassland, scrub and scattered conifers.

6.2.6 No attempt was made to revisit the original capture site. Instead, survey effort focussed on Barnhamcross Common, which supports habitat features seemingly identical to that within the MOD land but which lies closer to the Little Ouse River. In all, three general locations were searched for *C. walkeri*:

1. Land both sides of the A134 at Barnhamcross Common, but concentrating on habitats to the east, between the road and the Little Ouse River (three visits).
2. Riverside walk and parkland along the Little Ouse river as it passes through Thetford town (one visit).
3. Parts of the British Trust for Ornithology's (BTO) land at The Nunnery, adjacent to the Little Ouse River and lying between Barnhamcross Common and Thetford town (one visit).

In each location, dead trees and bushes were examined for likely nesting locations and the location was stalked for signs of Hymenoptera flying about these sites. On one day at Barnhamcross Common, short-term yellow pan-traps were set out close to likely nesting sites in the hope of luring flying insects to them for collection. In addition, potential nectaring plants (notably Wild Parsnip, Hogweed, Weld and Mignonette flowers) were searched for insects nectaring.

6.2.7 It is hoped that during the winter of 2009/10 a sample of hollow dead twigs will be collected from Barnhamcross Common in an attempt to rear out any nested Hymenoptera, but these results will not be available until the early summer of 2010.

7. Bee Projects

7.1 *Andrena ferox*

7.1.1 No further autecological work or distributional surveys were undertaken for this species in 2009.

7.2 *Andrena nigrospina*

7.2.1 In 2008 a group of recorders with an interest in the hymenoptera was brought together by the Worcestershire BRC to survey the *A. nigrospina* population at Upper Blackstone Farm, an extension to the Worcestershire Wildlife Trust's Devil's Spittleful heathland reserve. This group continued their autecological studies in 2009 with emphasis on determining foraging requirements and nest sites of the bee.

7.2.2 In 2009 *A. nigrospina* remained common at Upper Blackstone Farm with numbers similar to previous years but the flight period was earlier. The first record was on 21st April and the last on 9th July and site visits in later July and early August when the weather was cool, windy and wet produced no records whatsoever. This resulted in interesting records of early foraging.

Throughout most of the season foraging took place predominantly on the abundant wild radish where sometimes between 15 and 20 bees could be seen at one time. However, when the first records were made in April and early May no radish was in flower and there was little else available. At this time the bees were seen to use the only species in flower, dandelion *Taraxacum officinalis* (*sensu lato*) Later when radish was in flower alternative plants were occasionally used, including creeping thistle *Cirsium arvense*, bramble *Rubus fruticosus* (*sesnsu lato*) and hogweed *Heracleum sphondylium*. In the case of bramble it was not clear whether both pollen and nectar were being collected. Confirmation of the use of creeping thistle came from records at Highgate Common, Staffordshire, made by Andy Jukes.

7.2.3 As previously reported, only one nest of *A. nigrospina* had been found to date. This was located on a south-west facing slope close to an uncultivated field margin where it would receive maximum insolation whilst being sheltered from wind. It was also on a patch of ground almost free of vegetation. To extend our knowledge of nesting requirements three projects were undertaken. Areas of land within the reserve which seemed to provide conditions similar to those where the single nest had been found, i.e. had the right aspect and sparse vegetation, were carefully searched. Nests of mining bees were not uncommon but at no time were any of these seen to be used by *A. nigrospina*. A search of an adjacent enclosure containing Asian ungulates at the West Midlands Safari Park was unsuccessful also. Tracking foraging bees back to their nests proved very difficult indeed and though insects with pollen loads were seen to leave foraging areas they were quickly lost to sight and their destination was not found. There appeared to be no consistent direction taken by the bees but occasionally they were seen to fly rapidly to a great height suggesting that they may have been going to more remote nesting sites away from the fields in the study area. Create habitat which might attract bees, again using the single nest as a model, also proved ineffective. As with the search for nests in other parts of the site, mining bee nests were found later in the season but none of these could be linked to *A. nigrospina*. Despite the absence of clear evidence, it is possible that some of the mining bee nests located around the reserve were constructed by *A. nigrospina* but only continuing intensive monitoring can confirm this. A single specimen of the cleptoparasite *Nomada fulvicornis* was taken on the reserve but not the form that attacks *A. nigrospina.* Therefore, this record does not indicate that *A. nigrospina* is present as a breeding species.

7.2.4 Andy Jukes has also supplied a copy of a report he prepared on *A. nigrospina* for the Staffordshire Wildlife Trust. The following observations are based on his report.

7.2.5 *A. nigrospina* is known from Highgate Common SSSI in south Staffordshire, a Staffordshire Wildlife Trust site but no wild radish grows on the site, though the plant is found in surrounding fields. There is therefore an urgency to understand the ecology of this bee so that appropriate management can be undertaken to safeguard the bee for the future at Highgate Common and possibly in the surrounding area.

7.2.6 The bee was first found on Highgate Common during a survey undertaken in 1994/95 by Steve Falk and a subsequent survey in 2000 by Steve Falk and Jon Webb added greater clarity to the species status on the site. It was found to nest along numerous paths across open areas of the heath and was described as having a strong population. Work undertaken in 2009 shows a very strong decline in the species status on Highgate Common and anecdotally, the species has been at low numbers for at least 3-4 years though no thorough survey had been undertaken in this time. Only one female was recorded from the site in 2009 and was not found along pathways but from an area of short turf. Specifically it was recorded within an enlarged badger snuffle hole or a hole

dug by dogs. Highgate Common has undergone a decline in condition but the Wildlife Trust (who took over control of the site in April 2009) are to initiate a programme of scrub clearance and felling to encourage open habitats, including bare ground, to return to the site.

7.2.7 Numerous sites around Highgate Common were searched during 2009. Initially, arable fields that contained wild radish were noted and those with the greatest density visited on more than one occasion throughout the duration of the flight period of *A. nigrospina* (May-July). Following investigation of a selection of seemingly suitable sites, a possible factor in the decline of *A. nigrospina* on Highgate Common came to light. The arable fields around Highgate Common lack any abundance of wild radish, especially when compared to the Upper Blackstone farm site. The arable field margins are very poor with little to no wild radish. Other arable weed species are present though, namely scentless mayweed (*Tripleurospermum inodorum*).

7.2.8 This lack of wild radish may, in part, be linked to agri-environmental schemes around Highgate Common. Changes in local/regional or national targets concerning arable fields and UKBAP species may have inadvertently caused a change in the composition of arable weeds. The seed mixes generally available to farmers for arable field margins lacks wild radish. Fodder radish (*Rhaphanus sativa*) is included in the wildbird margin mix and is a similar species to wild radish, however, it is not know whether *A. nigrospina* will utilise this species of radish. It should be assumed that it does not and therefore wild radish should be included in the mixes.

7.2.9 It is suggested that, in the short term, special dispensation is given to a wild radish dominant seed mix for those arable fields closest to Highgate Common to provide a super abundance of wild radish for the bees. Over the medium to long term the wild bird mix and nectar flower mixes should be altered to accommodate wild radish as a component, perhaps as a special "*Andrena nigrospina*/solitary bee mix" or to replace fodder radish as a component.

7.3 *Colletes floralis*

7.3.1 Hymettus provided no direct funding for work on this species in 2009. However, through the partnership (comprising Hymettus, RSPB, BBCT and SNH) established to work on the Species Action Framework for *Bombus distinguendus,* Murdo Macdonald is working with the other partners to set up and train a network of local volunteer recorders and to establish a programme of annual survey and monitoring of *Colletes floralis* in Scotland. Several other individuals and organisations were involved in the survey and research work summarised in the following paragraphs.

7.3.2 Trial monitoring of *Colletes floralis* in the Western Isles showed that the population was very strong, and aggregations so extensive, that monitoring would be difficult and probably ineffective in detecting any but very large changes. Future monitoring has been delayed pending assessment of the full Scottish distribution in order to concentrate effort where it will be most informative.

7.3.3 Observations in the core range (W Isles and Argyll islands) have established that *Colletes floralis* is very widespread and often extremely abundant. This makes it very difficult to implement detailed numerical monitoring, as aggregations are so large and so frequent that delimiting them is very difficult. It has also become apparent from casual observations in 2009 that it is more common and widely distributed in Ayrshire than previously thought. Its current

status in Dumfries & Galloway is unknown. The proposal for 2010 onwards is that the actual distribution of *Colletes floralis* on mainland Scotland (and the possible island sites that have not been surveyed) should be established before a monitoring programme is put in place and that monitoring should be concentrated on the marginal parts of the range and areas where population density is low. This is seen as a more practical goal and would provide more meaningful data than is likely to emerge from monitoring the bee in its strongholds.

7.4 Northern bees project

7.4.1 An initial survey for the six species *Andrena coitana, A. similis, A. tarsata, Bombus muscorum, Nomada obtusifrons* and *N. robertjeotiana* was undertaken by Andy Jukes in 2007 in the Peak District and Lancashire saltmarshes. Although the survey provided no evidence of the presence of *B. muscorum* in the Peak District, only part of the area could be searched in the time available and a number of other locations that had possible suitable habitat for *B. muscorum* were noted. For this reason a second and latterly, third year of funds have been made available to continue this search. This third year effort was more focussed on identifying and surveying areas with a good presence of cross-leaved heath (*Erica tetralix*), a noted foraging plant for queens of *B. muscorum*.

7.4.2 Fifteen locations within the Peak District National Park were visited on at least one occasion between 30th June 2009 and 14th August 2009. Three were sites visited in preceding years but the other twelve were new sites, and in some instances in new areas such as the Chatsworth Estate moorlands (Beeley Moor area) and the moorlands south-west of Hathersage (Overton Moor and Grindleford Moor). There are now very few large areas left in the Peak District that have not received at least one visit over the three years of the project.

7.4.3 No evidence could be found of *Bombus muscorum* at any of the sites visited. Due to the slightly earlier schedule of visits (primarily late June-July), no additional information was gathered to contribute towards the other five target species which for four of the five species peak in mid-July and their cleptoparasites in August.

7.5 *Osmia inermis*

7.5.1 Hymettus again obtained a grant from CNPA for survey work on *Osmia inermis* in connection with the Cairngorms LBAP. The work was coordinated by Murdo Macdonald but the work reported here also involved Stewart Taylor.

7.5.2 On 12th June 2009 Murdo Macdonald visited Meall Gruaim, in excellent weather for finding foraging bees, and searched the whole of the area including examination of the stone trap nests set out on the hill in 2008. No bees were seen, and no new cells were present on the trap nests. On 24th June 2009 Stewart Taylor visited Meall Gruaim, found all the piles of stones and spent time in the same locations surveying the areas of *Lotus* for foraging bees. During an extended tour of the hill he located a drystone dyke at NN88966848. On 6th August 2009 Murdo Macdonald revisited Meall Gruaim in order to carry out an end-of-season check on the trap nests. All stones were located and checked but no new cells were found. The stone dyke found on 24th June was inspected. It proved impossible to visit Tulach Hill. The possible period for a stone-turning visit at the end of October was spoiled by bad weather.

7.5.3: The trap nests are still on Meall Gruaim and should remain usable for another year so they could be visited in 2010 if CNPA were to provide funding. However, it is discouraging that no sign of current activity has been obtained so far, in what was a key nesting area not very long ago.The drystone dyke mentioned above is potential habtat, but it would require considerable time and man-power to identify any *Osmia* nesting in it. The only prospect, given that the wall is so long and cannot be dismantled, is that on a sunny day (or several) in June or July a team could repeatedly walk the length of the wall in the hope of encountering bees entering with nesting material or a pollen load. Poor weather conditions and limited availability of personnel prevented a visit to Tulach Hill in 2009. The site should be surveyed, if funding can be made available in 2010, when it can be made a priority.

7.6 *Osmia parietina*

7.6.1 Hymettus provided no funding for work on this species in 2009.

7.7 *Osmia uncinata*

7.7.1 Hymettus provided no funding for work on this species in 2009.

7.8 *Osmia xanthomelana*

7.8.1 Hymettus provided no funding for work on this species in 2009. However, Carl Clee did receive some support from CCW to continue his studies and his findings are summarised here. The study involved eight visits to Porth Neigwl, one of only two UK localities for *Osmia xanthomelana*, between 18th April and 30th May 2009. Timed observations and video recording of males and females at a nest aggregation discovered during an abortive survey in 2008 provided information on emergence dates, male to female sex ratio, mating, mud collection and nesting behaviour.

7.8.2 The first males emerged on 27th April 2009 when 23 were recorded at the nest site. A further ten males emerged on 29th April and seven more on 2nd May 2009. Many of the earlier males were recorded on flowers of *Taraxacum* species as they dispersed to surrounding areas later. Males were observed landing on patches of bare sand and appeared to be depositing a scent marker, their abdomens pulsed as they remained for several minutes. The males were continually seen to return to the same spot, several males also went back into the burrows from which they had emerged. The first males to emerge were around the same size as the females but later emerging males were smaller. The smaller males later remained close to the nest site after the dispersal of the large males and were seen attempting to copulate with females returning to their burrows with mud for cell construction.

7.8.3 The first females emerged on 2nd May 2009 when nine were seen and further emergences were recorded during the following days totalling 28 females from this nest site. Emerging females remained around the nest site and males were recorded copulating with them on the bare patches of sand to which males were constantly returning. Females were then recorded digging fresh burrows and in some cases cleaning out existing burrows from which they had presumably emerged. The females frequently emerged from the burrows they were excavating and flew off presumably to feed before returning to the burrow. Following nest construction females began collecting mud from a nearby seepage and returning to their burrows.

7.8.4 Searches of surrounding areas revealed seven females with burrows on a site created by habitat management during February 2009, two females with nests near a previous nest location and one female with a nest at the location where the bee was first discovered. Video recording revealed multiple occupancies of burrows by females confirming observations made during previous surveys. 38 females and 40 males were recorded during the survey suggesting a sex ratio of one to one.

7.8.5 The movement of nesting females into areas where habitat management has been carried out raises the possibility that similar management further inland from the cliff edge could be beneficial to the survival of this species at Porth Neigwl. The current main nest aggregation is very close to the cliff edge and if this area of cliff becomes undermined then a similar situation could arise as that with the Isle of Wight population. This aggregation should be monitored regularly and if it looks to be in danger then translocation of the nests to a safer area should be considered. This was done successfully at another location where the nest area subsequently collapsed. The population at Porth Neigwl appears to be relatively stable at the present time.

7.9 *Anthophora retusa*

7.9.1 In 2009 a second grant was obtained from PTES to continue work on elucidating the autecology of the species at Seaford. For the second part of this project Mike Edwards, Rowan Edwards and Martin Jenner repeated the investigations of foraging and returning bees in order to attempt to collect pollen samples only this time the bees were collected and the dead specimens sent for analysis. Investigations during 2008 had shown that the local population would easily stand the loss of up to ten individuals for this purpose and the method would ensure that any pollen sample was sufficient to give a robust output regarding the plants visited. In the 2008 work the only sample taken (by temporarily holding the bee in a tube) proved to be too small to allow identification of the pollen with any confidence. Dr Judy Webb of Oxford agreed to undertake any pollen analysis required.

7.9.2 A few nests in the cliff at Seaford were excavated with the intention of obtaining cell linings from incomplete nests to check if these contained free sugars (i.e. had been worked directly with nectar) and obtaining pollen loaves from completed cells. Dr Rob Paxton of Queens University Belfast agreed to get an analysis for sugars undertaken.

7.9.3 The analysis of the pollen gathered from the legs of *Anthophora retusa* in the field show this be to be associated with a range of flower species typical of mesotrophic meadows. Therefore, *A. retusa* cannot be described as broadly oligotrophic (associated with the pollen of just one plant family). Although many modern records associate this bee with the flowers of Ground Ivy *Glechoma hederacea,* pollen from this flower is not a major component of forage, despite the high frequency of plants on the site. There does seem, however, to be a strong need for flowers with high nectar content and Ground Ivy, being a labiate, satisfies this need very well. However, so do the flowers of the typical legumes visited by the bees. Overall, it is the density of the suitable species in flower, both for pollen and nectar, which appears to be the critical resource for this species.

7.9.4 The results from the nest excavations were not as clear-cut as would have been desirable. Once under the immediate surface of the cliff it was clear that nest tunnels ran in all directions.

An attempt was made to mark out specific tunnels where females had entered by squirting weak plaster of Paris down them, a technique used successfully before. This worked for the first few centimetres but became too faint to follow just as things got really confused. The female bee was retrieved in two of the excavations, but it was impossible to tell which set of cells she was associated with. Likewise, cells, which were clearly full of nectar, broke, their contents rapidly seeping into all adjacent material. Checking for sugars in any lining was clearly a non-starter.

7.9.5 A number of cells which held larvae and a pollen ball, which was swimming in nectar, were obtained. However, there were several large *Andrena* species also present on the cliff, so there was no guarantee that the pollen balls were not from these bees. Furthermore the pollen loads looked too small and too discrete to be *Anthophora*, which apparently tends to mix pollen and nectar into a fairly even goo. The pollen balls all proved to contain large amounts of *Acer* pollen. This plant genus was not present within 0.5km of the nest site.

7.9.6 The probable factor behind the modern decline of *Anthophora retusa* is the loss of mesotrophic meadows with a high diversity and population of suitable nectar and pollen forage plants; the case made by Hymettus when putting this species forward for the BAP review. Having suitable nesting resources is also essential, but the spread of earlier records in a variety of habitats suggests that this was originally less restricting. It may well be that, in a modern context, the juxtaposition of both flower resource and nesting resource is extremely limiting, notwithstanding the relatively high foraging distances travelled by the bees in the current study. Habitat management for this bee should, therefore, aim to provide a high level of suitable flower species, flowering at the appropriate time. As management to provide this over longer timescales may well require that the bee forage areas are sometimes grazed at the time of flowering, it is important that forage resources are considered over a landscape scale, with only part of the area being in good condition during the flight period in any one year. Nesting resources should be maintained in an open, sunny position. These do not necessarily need to be particularly close to the foraging resource, but should be within 1km range, preferably not more than 0.5km.

7.9.7 It is strongly recommended that the management plan being developed as part of the managed retreat programme at Seaford Head recognises the need for the provision of alternative foraging areas within suitable flight distance of the nesting area of *A. retusa*. Under such a plan, one field should not be grazed during the flight period of *A. retusa*. Rotating the ungrazed meadow between two or more sections of the seaward end of the eventual field system on a year-by-year basis would probably be a better strategy than keeping one field permanently under a late-graze system. The resulting variation in ecological stress through grazing would provide more overall niches for plant establishment than a constant stress environment. This management system would also benefit the population of the BAP bumblebees *Bombus humilis* and *Bombus muscorum,* both of which were found in the area during the two-year study period, and of which *B. humilis* was by far the more frequent one.

8. Bumblebee Projects

8.1 *Bombus subterraneus*

8.1.1 The partnership of Bumblebee Conservation Trust (BBCT), Hymettus Ltd., Natural England (funding body) and RSPB (advised by Swift Ecology) continues with plans for the re-establishment of *Bombus subterraneus* in England. The project officer, Dr Nikki Gammans, visited New Zealand over the winter of 2009/10 working with local researchers to capture and breed queens for returning to the UK in summer 2010.

8.2 *Bombus distinguendus*

8.2.1 The partnership comprising Hymettus Ltd., RSPB, BBCT and SNH has continued to work towards conservation actions for *B. distinguendus*. The partners are supported by a number of other organisations on the Project Steering Group namely Highland Council Ranger Service, FWAG, Orkney LBAP, Sutherland LBAP, Caithness LBAP, Western Isles LBAP and Argyll LBAP.

8.2.2 The objectives of the *B. distinguendus* Project are (summarised from the Memorandum of Agreement):

- To implement some specific actions which will ultimately inform and support the taking forward of other actions in the implementation plan
- To set up and train a network of local volunteer recorders and to establish a programme of annual survey and monitoring of *Bombus distinguendus* (and *Colletes floralis)*.
- To begin the process of creating demonstration plots of *Bombus distinguendus* habitat along the North coast.
- To distribute education packs for primary schools and posters and leaflets for crofters.

8.2.3 Groups of volunteers have been recruited in the Western Isles, Caithness, Sutherland and Orkney but teams are small and there is concern that plans may be impossible to implement if even a few discontinue their involvement. This is impossible to pre-empt, and problems will need to be dealt with as and when they arise. Training of volunteers is up to date, in all areas except the Argyll islands. Some additional training will be required at the start of 2010 but monitoring of *B. distinguendus* should be able to proceed as intended in 2010. The final list of monitoring sites will be set before summer 2010, taking into account the new sites discovered in Caithness in 2009.

8.2.4 Planting and ground preparation has gone ahead on demonstration plots at Melness and Murkle. Other sites are still in consideration for work in 2010. It has become evident that SRDP is not an appropriate route of funding for many of the sites identified as demonstration plots, as they are too small, or because the work involved in applying for SRDP assistance is too great for the expected returns. At one site the work required of a very interested crofter proved too onerous and progress on that site has been deferred. Planting at the Murkle site was funded by an Action Earth grant applied for locally and such small scale funding may need to be considered more

generally. There is still a need to find a site that is appropriate for an application to SRDP and can be included in the programme.

8.2.5 It has become obvious in the course of the year that there is no 'one stop shop' at which the up-to-date distribution of *B. distinguendus* may be ascertained. Data are held in various datasets (notably RSPB, BWARS, HBRG, Orkney LRC) with various levels of quality control and public access and no integration. Some records will appear in more than one dataset and there are some which remain in individuals' records only. The project steering group agreed that it would be desirable to have a single database of recent, verified and publicly-available records defined at 100m minimum resolution, so that anyone with an interest (academic, conservation, or agricultural) can access reliable current data.. Options for achieving this will be presented to the steering group at its next meeting.

8.3 *Bombus ruderarius*

8.3.1 No further autecological work or distributional surveys were undertaken for this species in 2009.

8.4 *Bombus sylvarum*

8.4.1 Hymettus funded no work specific to *Bombus sylvarum* in 2009. However, CCW contracted Matt Smith to investigate the status and distribution of the species on the Gwent Levels and on Newport Wetlands NNR and the following is summarised from his report. The survey was carried out during thirteen days of fieldwork in August 2009, when numbers of workers and males were likely to be at their maximum. Surveys focussed on flower-rich meadows, road verges, reen banks and coastal margins where bumblebees were likely to be foraging. At each locality surveyed, the species and sex of any bumblebee species present were noted, together with flower species being used as forage.

8.4.2 During the survey, twelve species of bumblebees were recorded from 129 localities. *B. sylvarum* was found to be widely distributed across the eastern Gwent Levels and was recorded from 109 localities. *B. sylvarum* numbers were greatest at sites in the western part of the survey area and lowest at sites in the eastern part. Over 500 individuals were recorded from the Newport Wetlands NNR on 8th August 2009. The reason for this decline in numbers noted from west to east across the survey area is probably due to a number of factors, though a major one would appear to be the lack of larger areas of bumblebee forage. The eastern end of the survey area appears generally more "tidy" than the areas around sites such as Saltmarsh and Goldcliff; most of the fields are well grazed pasture and there are fewer areas of flower-rich hay meadows or resting horse paddocks (these paddocks appear to support a good growth of knapweed if left ungrazed). Many of the roadside verges or reen banks appear to be "over managed" and cut on a regular basis, thus removing potential flowers. Two additional BAP bumblebee species were recorded during the survey, *B. ruderarius* and *B. humilis*.

8.4.3 *B. sylvarum* was recorded visiting 26 species of plants and noted as collecting pollen from seven plant species. Important forage plants were narrow-leaved everlasting-pea *Lathyrus sylvestris*, common knapweed *Centaurea nigra*, tufted vetch *Vicia cracca*, common bird's-foot-trefoil *Lotus corniculatus* and sunflower *Helianthus annuus*. Red clover and sunflower appeared to be important sources of forage for pre-hibernation bumblebee queens.

8.4.4 The populations of *B. sylvarum* at the Newport Wetlands NNR and Nash & Goldcliff SSSI are of national importance and, although not Notified, should be regarded as Qualifying features on the relevant SSSI. The smaller populations on Redwick & Llandevenny SSSI probably also merit this status, whilst those on Magor & Undy SSSI are too small unless considered as part of a wider Gwent Levels metapopulation.

9. East Anglian Wetland Aculeates Project

9.1 Surveys for a suite of six aculeates (the BAP species *Odynerus simillimus* also *Anoplius caviventris*, *Hylaeus pectoralis*, *Macropis europaea*, *Passaloecus clypealis*, and *Rhopalum gracile*) were continued at eleven wetland locations across the Norfolk Broads (Rivers Ant, Bure, Thurne and Yare) in 2009. Each of the locations was visited once in mid June and again in mid August. Paddy Saunders sampled the sites using a sweep net and attempted to replicate the technique of Martin Drake. In addition, 100 trap nests were placed around Little Bog at Sutton Fen. These consisted of 15cm lengths of reed bundled inside 5cm diameter plastic pipe which were then attached to bamboo canes. These traps were collected from the field in March 2010 and the contents have yet to be analysed. Martin Drake supplied specimens he had collected in late June 2009 from the same sample sites visited by Paddy Saunders earlier in the month. These specimens were identified by Paul Lee. An additional set of specimens collected by Martin Drake from other Broadland sites in 2008 were identified by Mike Edwards.

9.2 Sweep netting in June 2009 proved more successful than in 2008. The only specimen of *Rhopalum gracile* seen in 2009 was collected in this way by Paddy Saunders. Table 4 summarises current knowledge of the distribution of the target species in the river valleys of the Broads. All visits to the two sites in theYare valley failed to detect the presence of the target species although *Hylaeus pectoralis* and *Macropis europaea* have been recorded here in previous years. Only two of the target species (*Anoplius caviventris* and *Macropis europaea*) were not collected from the Thurne valley in 2009. Only *Passaloecus clypealis* was not collected from the Ant valley in 2009 but Martin Drake did take several specimens here in 2008. Only *Rhopalum gracile* was not collected from the Bure valley in 2009 but Martin Drake did take a specimen here in 2008. A male *Odynerus simillimus* collected on the Norfolk Wildlife Trust's Ebb & Flow reserve was the first record of this species from the Bure valley.

Table 4: Occurrence of rare wetland aculeates in the Norfolk Broads 2007-9

	CATCHMENT			
	Ant	Bure	Thurne	Yare
SPECIES				
Anoplius caviventris	●	●		
Odynerus simillimus	●	●	●	
Rhopalum gracile	●	●	●	
Passaloecus clypealis	●	●	●	
Hylaeus pectoralis	●	●	●	●
Macropis europaea	●	●		●

9.3 Again *Hylaeus pectoralis* was the most widespread of the target species. There were few records of *Macropis europaea* but this was probably a result of the sample sites visited with little

or no Yellow Loosestrife in flower at most. The current status of *Odynerus simillimus* is reported in section 3.2.2 of this document. *Passaloecus clypealis* was recorded at three sites in 2009 and, interestingly, specimens were collected by vacuum sampling at two of these sites. The wasp was recorded at three other sites in 2008 and appears widespread if uncommon in suitable habitat. Only a single specimen of *Rhopalum gracile* was seen in 2009 but the wasp was collected at three other sites in 2008. On current evidence, *Anoplius caviventris* would seem to be the rarest of the target species in the Broads. It was recorded from just two sites in 2009 and not at all in 2008.

10. Development of Hymettus Ltd.

10.1 An Annual Report and accounts for the year from 1st April 2008 to 31st March 2009 have been prepared for submission to Companies House and the Charity Commissioners as required by law. The report stated that:

During 2008/9 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 this research has been widely disseminated and translated into practical conservation advice where possible.

In addition working relationships have been established with a number of academic institutions both to provide support to students and as a partner in research bids. The company has also worked with Buglife in providing a response to the consultation exercise on the fifth quinquennial review of the Wildlife and Countryside Act.

10.2 The financial support provided by the Esmee Fairbairn Foundation has now ended and alternative sources of funding are being sought. Hymettus is actively seeking to work with new partners including commercial organisations and other non-hymenopteran interest groups. Hymettus is leading a consortium of invertebrate NGOs in competing for Defra funding for UK BAP species research. An initial expression of interest has been successful and a full tender is now being written.