Aculeate bee and wasp survey report 2015/16 for the Knepp Wildland Project

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Methodology

Aculeate bees and wasps were surveyed on the Knepp Castle Estate as part of their biodiversity monitoring programme during the 2015/2016 seasons. The southern block, comprising 473 hectares, was selected for the survey as it is the most extensively rewilded section of the estate. Nine areas were identified in the southern block and each one was surveyed by free searching for 20 minutes on each visit. Surveys were conducted on April 13th, June 3rd and June 30th in 2015 and May 20th, June 24th, July 20th, August 7th and August 12th in 2016.

Survey results and species of note

A total of 62 species of bee and 30 species of wasp were recorded during the survey. This total includes seven bee and four wasp species of national conservation importance (Table 1, Table 2). Rarity classifications come from Falk (1991) but have been modified by TW to take account of the major shifts in abundance that have occurred since the publication of this review. The important bee species were *Andrena labiata*, *Ceratina cyanea*, *Lasioglossum puncticolle*, *Macropis europaea*, *Melitta leporina*, *Melitta tricincta* and *Sphecodes scabricollis*. Both *A. labiata* and *C. cyanea* show no particular affinity for clay. Both forage from a wide variety of plants and are considered scarce nationally for historical reasons and for their restricted southern distribution. *M. leporina* and *M. tricincta* are both oligolectic bees, collecting pollen from one botanical family only. *M. leporina* favours Fabaceae whereas *M. tricincta* is more narrowly focused on red bartsia *Odontites vernus* only. Both species are more common on chalk where their host plants are most common, but can be found on clay where conditions are right, as they are at Knepp. *L. puncticolle* is a more classical clay associate. Its nesting ecology is poorly understood but it is thought to require desiccation cracks and so is found most frequently on the clay. *M. europaea* is unusual as it is one of the few bee species to nest in damp to partially winter-flooded soils. It visits yellow loosestrife *Lysimachia vulgaris* exclusively for pollen but also for floral oils that it uses to waterproof its nest. Finally *Sphecodes scabricollis* is the cleptoparasite of the sweat bee *Lasioglossum zonulum*. *L. zonulum* is restricted to the south of the south of England but is locally common, particularly on damp soils. The population at Knepp is very strong and *S. scabricollis* can be found quite easily.

The four important wasp species were *Crabro scutellatus*, *Gorytes laticinctus*, *Odynerus melanocephalus* and *Pemphredon morio*. *C. scutellatus* is a very local species in southern England, found predominantly on damp heathland. It hunts adult Dolichopodid flies which can gather in large numbers on exposed, damp soil. There are many such suitable areas at Knepp were these flies can be found (Figure 1). Whilst *C. scutallatus* was not seen hunting during the surveys, these areas are the most likely place for this behaviour to be observed. *G. laticinctus* was a very scarce species of wasp that was previously mostly known from light soils in the New Forest and the Thames Gateway. However, it has greatly expanded its range over the past 10-15 years, though it is still surprising to see it on heavy clay soils. *Odynerus melanocephalus* is a classic clay associate that is most frequently found where disturbance has created sloping, lightly vegetated clay banks. It hunts for *Hypera postica* weevil larvae which develop on black medick *Medicago lupulina*. No nest sites could be

found, but if enough suitable habitat is searched they will be found and should be monitored for jewel wasp (family Chrysididae) activity as *O. melanocephalus* is probably host to the very scarce *Pseudospinolia neglecta*. Finally the hunting wasp *Pemphredon morio* was also found. This wasp is fairly nondescript, hunts aphids and nests in dead wood. Reasons for its scarcity are unknown.

Comparison with other sites

In addition to surveying aculeate bees and wasps, all flowering plant species (excluding grasses, rushes and sedges since these are unattractive to bees) seen during the survey were recorded. A total of 87 flowering plants were counted, with 65 in 2015 and 84 in 2016. This allowed a comparison between Knepp and the 19 conventionally managed farms in West Sussex and Hampshire surveyed by TW during his PhD. Wood *et al*. (2016) found a significant relationship between flowering plant diversity and the diversity of bees present at a site. Including the 2015/2016 data (Figure 2), Knepp has a higher than expected bee diversity relative to the number of flowering plants present. This analysis must come with caveats, as the survey methodology used at Knepp allowed for more comprehensive searching of habitats that the continuous transect technique used on the conventional farms. However, even with caveats Knepp is still at worst equal to the richest conventionally managed farms and most likely supports a greater bee species richness.

A more general comparison can be made with various nature reserves on clay substrates found in Surrey. Surrey is probably Britain's best surveyed county for aculeates, both historically and in the present day. The fauna has been recently covered with the excellent Bees of Surrey (Baldock 2008) and Wasps of Surrey (2010), with surveys covering the lower Weald of southern Surrey but also the Parks and Commons on the London Clay. A summary of the findings can be seen in Table 3 which include the findings for the one farm on clay soils surveyed during Wood *et al*. (2016). Whilst the total of 92 bees and wasps found at Knepp is fair, it is average in comparison to these other sites.

In terms of bee species, most sites will have between 50-65 species. It is not until you move to flower-rich woodland with extensive woodland rides or mature post-industrial claypits that you see a bee fauna of over 80 species. Baldock (2008; 2010) proposed a number of clay associates for Surrey that are listed in Table 4. For the bees, *Eucera longicornis* and *Andrena labialis* are very strongly associated with Fabaceae, and *Sphecodes rubicundus* is the parasite of *A. labialis*. Whilst the Fabaceae oligolecs *Andrena wilkella* and *Melitta leporina* were found at Knepp, they are most strongly associated with trefoils *Lotus* and clovers *Trifolium* whereas *E. longicornis* and *A. labialis* are more strongly associated with vetches and vetchlings, *Vicia* and *Lathyrus*. Whilst the former plants are present at Knepp in larger numbers, the conditions do not seem to favour vetches which are present at a very low density. More generally, these same sites are generally flower rich and consequently support a greater diversity of bees than Knepp.

For wasps species, most sites have between 40-50 species. The exception is Ashted/Epsom Common which has a very extensive dead wood fauna. Clay has never been a favoured substrate for aculeate Hymenopterists due to its propensity to become waterlogged in the winter and baked hard during the summer. Consequently, many of the characteristic wasp species of clay (Table 4) are ground nesters that are adapted to deal with these difficult conditions. Out of the total of 30 species of wasp at Knepp, only five of these were ground nesting species. The predominantly ground nesting spider wasps (family Pompilidae) were particularly poorly represented with only the common *Anoplius nigerrimus* present. Many of the best clay sites for wasps are either woodland, because the trees reduce the water content of the soil, or claypits, where the steep gradient ensures the same

thing. Whilst not without woodland, Knepp is still predominantly open habitat and it does not have steep, well drained slopes and consequently it lacks much of the microhabitat required by these specialised species.

The cavity nesting wasp community at Knepp is most strongly represented by stem nesters, with the most common being *Crossocerus podagricus*, *Ectemnius rubicola*, *Pemphredon lethifer* and *Symmorphus gracilis*. As the project ages the availability of dead wood will increase and the diversity of exclusively dead wood nesters will also increase. Many common species groups such as the genus *Ancistrocerus* were seemingly absent which is quite surprising. Again, this is most likely attributable to the overall age of the project. Continuing surveys over the coming years will hopefully detect these species as they colonies the area. We would strongly recommend the use of a Malaise trap to survey for difficult to detect groups such as Pompilidae and Chrysididae. This could be run continuously around the year but would require some kind of fencing to prevent trampling by livestock.

Important aculeate habitats and forage plants

Whilst many plants are visited by bees and wasps, the following species are particularly important for this group:

Willows *Salix* spp. – the mining bees *Andrena clarkella* and *Andrena praecox* collect their pollen exclusively from willows in the spring. Many other spring mining bees will also use this abundant resource. In the summer, *Symmorphus bifasciatus* will hunt for blue willow beetle *Phratora vulgatissima* larvae here

Blackthorn *Prunus spinosa* and hawthorn *Crataegus monogyna* – Widely used by mining bees *Andrena fulva*, *Andrena scotica*, *Andrena trimmerana* and *Andrena haemorrhoa*

Field maple *Acer campestre* – Favoured by mining bees such as *Andrena helvola* and *Andrena fucata* that tend to visit woody shrubs and trees rather than herbaceous plants

Umbellifers *Heracleum sphondylium* and *Oenanthe crocata* – umbellifers were generally very scarce and grazed out but where they were present they attracted mining bees like *Andrena chrysosceles* and *Andrena minutula* and cavity nesters like *Hylaeus communis*. Whilst few wasps were seen visiting them, umbellifers are used as nectar plants by most wasps

Buttercup *Ranunculus repens* – Very popular pollen source for sweat bees, particularly *Lasioglossum laevigatum* and *Lasioglossum zonulum*. *Andrena labiata* is also partial. Surprisingly, the *Ranunculus* specialist *Chelostoma florisomne* was not recorded despite the habitat appearing to be perfect.

Bramble *Rubus fruticosus* – a very important pollen and nectar plant. Used extensively by bumblebees and honeybees, particularly *Bombus pratorum*, *Bombus hypnorum* and *Bombus terrestris*, and also the cuckoo bumblebee *B. vestalis*. Brambles are also an important pollen source for second generation *Andrena* such as *Andrena bicolor*, *Andrena dorsata*, *Andrena minutula*, *Andrena flavipes* and *Andrena trimmerana.*

Clovers *Trifolium* and trefoils *Lotus* – Visited extensively by bumblebees for pollen but also used by the Fabaceae specialists *Melitta leporina* and *Andrena wilkella*. Whilst not observed, *Osmia caerulescens* and *Lasioglossum lativentre* will also use these flowers extensively for pollen

Marsh thistles *Cirsium palustre* and creeping thistle *Cirsium arvense* – marsh thistle was an important pollen source for *Lasioglossum puncticolle* but thistles were mostly used by bumblebees and honeybees for nectar.

Ragworts *Senecio jacobaea* and common fleabane *Pulicaria dysenterica* – a popular nectar source for honeybees, most importantly used by sweat bees *Lasioglossum malachurum* and *Lasioglossum pauxillum* in the late summer. Also used by the second generation of *Andrena flavipes.*

Marsh woundwort *Stachys palustris* – the only observed pollen source of the oligolectic *Anthophora furcata. Anthidium manicatum* can be found in some numbers around patches of this plant which serves as both a source of pollen and plant fibres used in nesting. It is also popular with long tongued bumblebees like *Bombus hortorum.*

Water figwort *Scrophularia auriculata* – a popular nectar plant for social wasps *Vespula* and *Dolichovespula*. The potter wasp *Symmorphus gracilis* also hunts figwort weevil *Cionus hortulanus* from this plant.

Yellow loosestrife *Lysimachia vulgaris* – the sole pollen and floral oil forage plant for *Macropis europaea*. Overgrown drainage ditches are important habitat for this plant.

Mayweed *Tripleurospermum inodorum* – the only plant visited by *Colletes daviesanus*. It is an Asteraceae oligolec so other plants will also be used.

In terms of nesting habitat, vehicular tracks were by far the best for ground nesting species (Figure 3). The regular compaction of the soil creates the perfect conditions for structurally sound nests. In contrast, bare patches produced by livestock, particularly pigs, were very rarely used by aculeates for nesting. This kind of disturbance does not seem to be appropriate for aculeates as it does not compact the underlying soil sufficiently. Knepp generally lacks high quality nesting habitat in the form of steep, well drained soils and mature whole tree dead wood. However, this is mainly a reflection of the age of the site and the project and as time goes by aculeate diversity is likely to increase.

Conclusions

For a site that was fairly intensive agriculture little over a decade ago, the southern block of the Knepp Estate now supports an aculeate community which, although not as rich as some of the finest clay sites in the south east of England, is very probably richer than its conventionally agricultural peers. Given the composition of the community it is likely that the total will continue to increase as the site matures.

References

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Figure 1. Area of exposed, damp clay. This is perfect hunting habitat for wasps like *Crabro scutellatus* because of the large number of Dolichopodid flies that gather in such areas. *Odynerus melanocephalus* was also recorded visiting this area, though this may have been to collect the damp clay that is used to build their nest entrances.

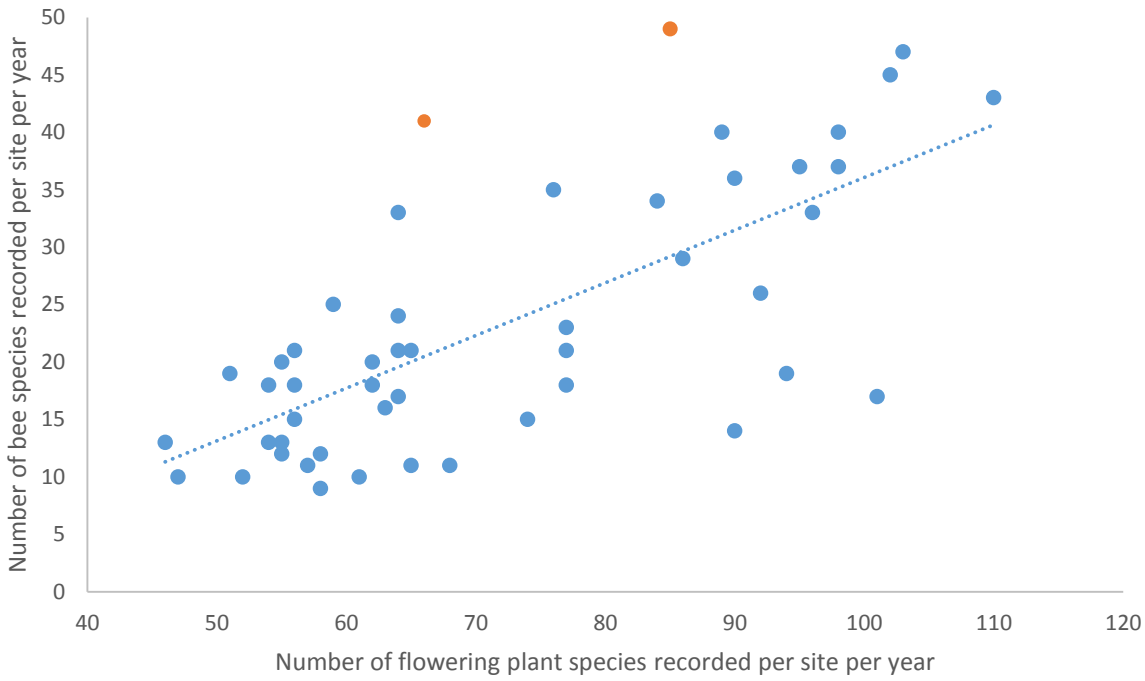

Figure 2. The relationship between flowering plant species richness and bee species richness on surveyed conventional agricultural farms (blue dots). GLMM, χ^2=33.7, p<0.001. Data from Wood *et al*. 2016. The results for Knepp are marked by orange dots.

Figure 3. Area of compact, friable clay. This kind of habitat is perfect for ground nesting aculeates with *Lasioglossum malachurum*, *L. pauxillum*, *L. minutissimum* and *Lindenius albilabris* all found here in some numbers in the summer. In the spring, similar tracks are very popular with mining bees, in particular *Andrena fulva* and *A. praecox*. In comparison, pig rootled ground contained very few nests, as whilst it was open and disturbed it lacked the same regular compaction favoured by aculeates.

Table 1. Full list of bee species recorded in the southern block at Knepp with rarity status and general ecological requirements. Species highlighted in bold are of particular note

Bee species	Status	Ecological requirements
Andrena bicolor	Common, widespread	Bivoltine, widely polylectic
Andrena chrysosceles	Common, widespread	Univoltine, polylectic
Andrena clarkella	Common, widespread	Univoltine, oligolectic on *Salix*
Andrena dorsata	Common, southern	Bivoltine, polylectic. Second generation very partial to *Rubus*
Andrena flavipes	Common, southern	Bivoltine, widely polylectic. Second generation very partial to Asteraceae
Andrena fucata	Common, widespread	Univoltine, polylectic, associated with flowering trees and shrubs
Andrena fulva	Common, widespread	Univoltine, polylectic
Andrena haemorrhoa	Common, widespread	Univoltine, widely polylectic
Andrena helvola	Common, widespread	Univoltine, polylectic, associated with flowering trees and shrubs
Andrena labiata	**Nationally Scarce A, southern and central**	Univoltine, polylectic
Andrena minutula	Common, widespread	Bivoltine, polylectic
Andrena nitida	Common, southern and central	Univoltine, widely polylectic
Andrena praecox	Common, widespread	Univoltine, oligolectic on *Salix*
Andrena scotica	Common, widespread	Univoltine, polylectic
Andrena semilaevis	Common, widespread	Univoltine, polylectic with a preference for Apiaceae
Andrena subopaca	Common, widespread	Univoltine, polylectic
Andrena trimmerana	Common, southern	Bivoltine, polylectic. Second generation very partial to *Rubus*
Andrena wilkella	Common, widespread	Univoltine, oligolectic on Fabaceae
Anthidium manicatum	Common, widespread	Univoltine, polylectic with a preference for Lamiaceae
Anthophora furcata	Common, widespread	Univoltine, oligolectic on Lamiaceae
Apis mellifera	Common, widespread	The common honeybee
Bombus hortorum	Common, widespread	Social, polylectic
Bombus hypnorum	Common, widespread	Social, polylectic. First found in Britain in 2001
Bombus jonellus	Common, widespread	Social, polylectic. Scattered in southern England and Scotland
Bombus lapidarius	Common, widespread	Social, polylectic
Bombus lucorum	Common, widespread	Social, polylectic
Bombus pascuorum	Common, widespread	Social, polylectic
Bombus pratorum	Common, widespread	Social, polylectic
Bombus sylvestris	Common, widespread	Obligate social parasite of *Bombus pratorum*
Bombus terrestris	Common, widespread	Social, polylectic
Bombus vestalis	Common, widespread	Obligate social parasite of *Bombus terrestris*
Ceratina cyanea	**Red Data Book 3, southern. Should be downgraded to Nationally Scarce**	**Univoltine, polylectic. Stem nester. Historically very scarce but now frequent in the London-New Forest region.**
Colletes daviesanus	Common, widespread	Univoltine, oligolectic on Asteraceae
Halictus tumulorum	Common, widespread	Facultatively social, widely polylectic
Hylaeus communis	Common, widespread	Univoltine, polylectic
Hylaeus confusus	Common, widespread	Univoltine, polylectic. Generally associated with woodland
Hylaeus dilatatus	Common, southern	Univoltine, polylectic
Lasioglossum albipes	Common, widespread	Facultatively social, polylectic
Lasioglossum calceatum	Common, widespread	Facultatively social, widely polylectic
Lasioglossum laevigatum	Common, southern	Univoltine, polylectic
Lasioglossum lativentre	Common, central and southern	Univoltine, polylectic

Lasioglossum leucozonium	Common, central and southern	Univoltine, polylectic
Lasioglossum malachurum	Common, southern. Formally Nationally Scarce but much increased	Obligately social, very widely polylectic
Lasioglossum minutissimum	Common, central and southern	Univoltine, polylectic
Lasioglossum morio	Common, widespread	Facultatively social, polylectic
Lasioglossum pauxillum	Common, southern. Formally Nationally Scarce but much increased	Obligately social, very widely polylectic
Lasioglossum puncticolle	**Nationally Scarce B, southern**	**Univoltine, polylectic. A poorly understood species. Probably requires desiccated soil with cracks for nest construction. Forages from a variety of flowers**
Lasioglossum villosulum	Common, widespread	Univoltine, oligolectic on hawkish Asteraceae, e.g. *Hypochaeris* and *Crepis*
Lasioglossum zonulum	Common, southern	Univoltine, polylectic
Macropis europaea	**Nationally Scarce A, southern**	**Univoltine, oligolectic on *Lysimachia vulgaris*. One of the few bees found in wetlands, also collects floral oils from *L. vulgaris* to waterproof its underground nests**
Melitta leporina	**Not listed, southern. Should be upgraded to Nationally Scarce**	**Univoltine, oligolectic on Fabaceae. Recorded visiting *Lotus pedunculatus***
Melitta tricincta	**Nationally Scarce B, southern**	**Univoltine, narrowly oligolectic on *Odontites vernus*. Most frequently found on light soils but this plant can also be found in the Weald, as it is at Knepp**
Megachile versicolor	Common, widespread	Univoltine, polylectic
Nomada fabriciana	Common, widespread	Obligate cleptoparasite of *Andrena bicolor* and possibly other *Andrena* species
Nomada flava	Common, widespread	Obligate cleptoparasite of *Andrena scotica* and possibly other *Andrena* species
Nomada flavoguttata	Common, widespread	Obligate cleptoparasite of small black *Andrena* such as *minutula*, *subopaca* and *semilaevis*
Nomada marshamella	Common, widespread	Obligate cleptoparasite of *Andrena scotica*, *Andrena trimmerana* and possibly other *Andrena* species
Nomada panzeri	Common, widespread	Obligate cleptoparasite of *Andrena fucata*, *Andrena helvola* and other *Andrena* species
Osmia caerulescens	Common, widespread	Univoltine, polylectic with most pollen collected from Fabaceae and Lamiaceae
Sphecodes crassus	Common, widespread	Obligate cleptoparasite of various Halictid bees, in particular *Lasioglossum pauxillum*
Sphecodes ephippius	Common, widespread	Obligate cleptoparasite of many species of Halictid bees
Sphecodes monilicornis	Common, widespread	Obligate cleptoparasite of various Halictid bees, in particular *Lasioglossum calceatum* and *L. malachurum*
Sphecodes scabricollis	**Red Data Book 3, southern**	**Obligate cleptoparaste of *Lasioglossum zonulum***

Table 2. Full list of wasp species recorded in the southern block at Knepp with rarity status and general ecological requirements. Species highlighted in bold are of particular note

Wasp species	Status	Ecological requirements
Anoplius nigerrimus	Common, widespread	Summer flying spider wasp. Hunts various spiders
Chrysis spp		Obligately parasitic jewel wasp. This group is currently in some taxonomic flux so no name can currently be put to this specimen. However, it is likely one of the species attacking *Symmorphus* species
Crabro scutellatus	**Nationally Scarce A, southern**	**Very local hunting wasp. Hunts adult Dolichopodid flies, can be seen doing this on patches of wet mud where the flies gather in numbers**
Crossocerus cetratus	Common, widespread	Nests in dead wood, hunts various small flies
Crossocerus megacephalus	Common, widespread	Nests in dead wood, hunts various small flies
Crossocerus nigritus	Common, widespread	Nests in stems and vacated galls, hunts various small flies
Crossocerus pogdagricus	Common, widespread	Nests in dead wood, hunts various small flies
Crossocerus varus	Common, widespread	Ground nester. Hunts various small flies
Dolichovespula media	Common, southern	Obligately social paper wasp. First found in Britain in 1980
Ectemnius continuus	Common, widespread	Nests in dead wood, hunts various flies
Ectemnius lituratus	Common, southern and central	Nests in dead wood, hunts various flies
Ectemnius rubicola	Common, southern and central	Nests in stems (not typical for *Ectemnius*), hunts various flies
Gorytes laticinctus	**Red Data Book, southern. Should be downgraded**	**Previously thought to nest only in light soils, but has become much more common in the last 10-15 years for unknown reasons. Hunts various Auchenorrhynchus bugs**
Lindenius albilabris	Common, widespread	Nests in the ground, frequently encountered in conjunction with *Lasioglossum* nests. Hunts bugs in the family Miridae
Myrmosa atra	Common, widespread	Obligate parasitoid on various bees and wasps. At Knepp found in conjuction with *Lasioglossum* nesting aggregations
Odynerus melanocephalus	**Nationally Scarce A, southern and central**	**Nests in sloping clay soils, hunts black medic weevil *Hypera postica* larvae**
Passaloecus singularis	Common, widespread	Nests in dead wood, hunts aphids
Pemphredon inornata	Common, widespread	Nests in stems, hunts aphids
Pemphredon lethifer	Common, widespread	Nests in stems, hunts aphids
Pemphredon lugubris	Common, widespread	Nests in dead wood, hunts aphids
Pemphredon morio	**Nationally Scarce B, widespread**	**Nests in dead wood, hunts aphids**
Rhopalum coarctatum	Common, widespread	Nests in stems, hunts small flies
Stigmus solskyi	Common, widespread	Nests in dead wood, hunts aphids
Symmorphus bifasciatus	Common, widespread	Nests in stems, hunts the larvae of the blue willow beetle *Phratora vulgatissima*. At Knepp females wasps were swept from willow leaves
Symmorphus gracilis	Common, widespread	Nests in stems, hunts figwort weevil *Cionus hortulanus*. Seen hunting around water figwort *Scrophularia auriculata* at Knepp
Trichrysis cyanea	Common, widespread	Obligate parasitoid of various small black cavity nesting wasps
Trypoxylon attenuatum	Common, widespread	Nests in stems and other small cavities. Hunts small spiders
Vespa crabro	Common, widespread	Obligately social paper wasp. The iconic Hornet
Vespula germanica	Common, widespread	Obligately social paper wasp
Vespula vulgaris	Common, widespread	Obligately social paper wasp

Table 3. Comparative species richness of bees and wasps between different clay sites in Surrey and West Sussex. Data from Baldock (2008; 2010) and Wood *et al*. (2016).

Site	Habitat	Area (ha)	Total species	Bees	Wasps
Holmens Grove/Stroud Wood	Clay woodland	100	133	86	47
Hambledon Claypit	Old claypit	20	132	87	45
Sidney Wood, Dunsfold SSSI	Clay woodland	100	131	81	50
Chiddingfold Forest	Clay woodland	250	126	86	40
Ashted/Epsom Commons	Clay woodland/grassland	200	115	51	64
Cranleigh Brickworks	Old claypit	25	108	59	49
Wandsworth Common	London Park clay	20	94	64	30
Knepp Castle Estate (southern block)	**Clay woodland/grassland**	**473**	**92**	**62**	**30**
Somersbury Claypit, Ewhurst	Old claypit	3	91	61	30
Sayer's Land, Dunsfold	Clay woodland	3	84	56	28
Bookham Common	Clay woodland/grassland	200	78	52	26
Higher Level Stewardship farm, Petworth	HLS farmland with clay woodland/grassland	176	68	55	13
Battersea Park	London Park clay	20	62	28	34

Table 4. List of clay associates, rarity status and general ecological requirements. 1=strongest association, 3=weakest association. Grading from Baldock (2008; 2010) and relative to the Surrey distributions. Species highlighted in bold are found at Knepp

Species	Clay	Status	Ecological requirements
Pseudospinolia neglecta	C1	No status, rare, should be Red Data Book	Obligate parasitoid of *Odynerus spinipes* and probably *O. melanocephalus*
Odynerus melanocephalus	**C1**	**Nationally Scarce A**	**Nests in sloping clay soils, hunts black medic weevil *Hypera postica* larvae**
Didineis lunicornis	C1	Nationally Scarce A	Nests in the deep dessication cracks that form on summer baked clay. Hunts Homopteran bugs in the families Cicadellidae and Delphacidae
Eucera longicornis	C1	Nationally Scarce A	Oligolectic on Fabaceae, favouring shrubby species in the genera *Lathyrus* and *Vicia*
Sphecodes rubicundus	C1	Nationally Scarce A	Obligate cleptoparasite of *Andrena labialis*
Chrysis viridula	C2	No status, should be Nationally Scarce	Obligate parasitoids of *Odynerus spinipes*
Priocnemis cordivalvata	C2	Nationally Scarce B	Summer flying spider wasp. Ecology poorly understood. In Surrey generally associated with woodland on clay
Priocnemis coriacea	C2	Nationally Scarce A	Spring flying spider wasp. Ecology poorly understood. In Surrey generally associated with damp oak woodland on clay
Gymnomerus laevipes	C2	No rarity status	Stem nester, hunts weevil larvae from the genera *Hyperea*
Lasioglossum puncticolle	**C2**	**Nationally Scarce B, southern**	**A poorly understood species. Probably requires desiccated soil with cracks for nest construction. Forages from a variety of flowers**
Andrena labialis	C2	No rarity status	Generally associated with Fabaceae-rich grassland on heavier soils
Odynerus spinipes	C2	No rarity status	Nests in sloping clay soils, hunts weevil larvae from the genera *Hypera*
Ceropales maculata	C3	No status, should be Red Data Book	Obligate cleptoparasite of various spider wasp species
Sphecodes scabricollis	**C3**	**Red Data Book 3**	**Obligate cleptoparasite of *Lasioglossum zonulum***