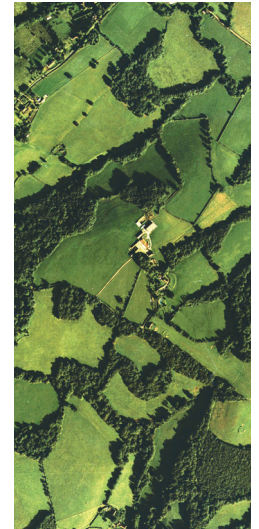
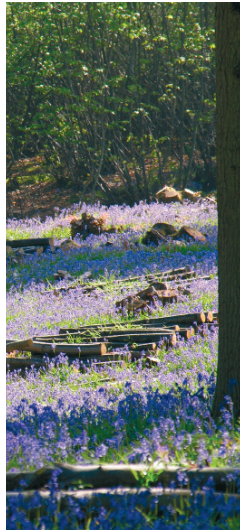
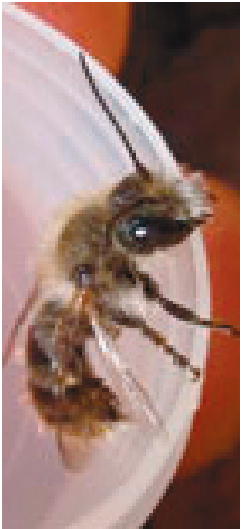


Introduction to Bees

Living Woods Event May 2014



Furthering understanding of one of England's Finest Landscapes



Introduction

- Bees are part of the Order Hymenoptera, which comprises of nearly 7,000 species in the UK. Most of these are parasitic wasps, such as the Ichneumons, and then the gall wasps and sawflies. The aculeate Hymenoptera (aculeates for short) are the bees, ants and wasps and there are about 600 species in the UK – about 250 of these are bees.
- The characteristic feature of aculeates is that the egg-laying ovipositor of the females is modified into a sting; the word 'aculeate' is derived from the Latin 'aculeatus', which means 'stinging'. The sting is used as a defence mechanism, but is also employed as a method for paralysing prey.
- Bees are a diverse group and can be found in a range of habitats.
- There are an estimated 25,000 species of bee worldwide with many yet to be described or even discovered.
- Bees range in size from tiny c.2mm worker stingless bees to the gigantic leafcutter bee that can reach nearly 4cm in length!
- They are excellent indicator species; good populations of bees at a site are a sign of a healthy ecosystem because of the range of nectar sources that they use.

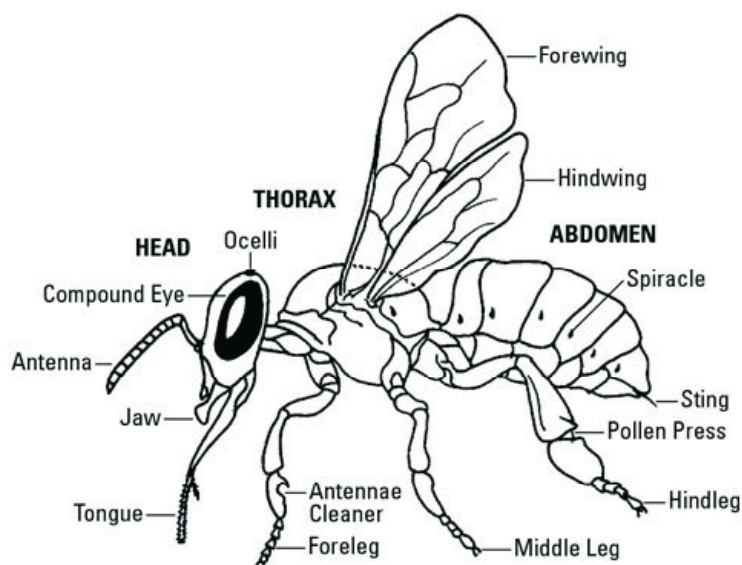
Bee or wasp?

- The technical difference between a bee and a wasp is that bees will feed their young on a mixture of pollen and nectar, whereas wasps will feed their young on invertebrate prey. Unfortunately, this isn't much help when it comes to deciding if the specimen you've got is a bee or a wasp. There are some which are easy to tell apart: the bumblebees and the social wasps, for example, but when it comes to the solitary species it starts getting more difficult.
- Generally speaking, bees are hairier than wasps and have a less pronounced 'wasp-waist', but some of the cuckoo bees can appear very wasp-like. When examined under a microscope, you can see that wasps are in fact hairy as well, but the key difference is that these are shorter, simple hairs, whereas those of a bee are generally longer and are plumose (i.e. feather-like).

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Anatomy



Finding bees

- Bees are found in a wide range of habitats from February through to November (and some bumblebees are now found throughout the winter!). They are warmth-loving so the best time to look for them is on hot, sunny days.
- The best place to look is on flowers where they - the females that is - will be collecting pollen and nectar to provision their larvae. The males will often be found scouting from flower to flower in search of females, so areas rich in flowers will generally be productive. Many bees will nest in the ground so looking for holes in patches of bare ground is often a good way of finding them. Solitary bees will tend to nest in aggregations and it is not uncommon to find different species nesting side by side. The cuckoo bees, which parasitize certain bee species, will often be found flying around these nesting aggregations so these can be quite good for yielding a number of different species.

Equipment

- The essential piece of equipment is a net; the best nets to use are kite nets or sweep nets with quite a fine mesh. The type of net you use is dependent on personal taste as some people will prefer targeted netting to sweep netting so net choice will often be based upon survey technique.
- Specimen pots are a must as well – you should never go out into the field without a pot in your pocket! The type of pot you use will again depend on personal taste, but glass pots tend to be the preferred option because plastic pots are liable to scratch easily and become opaque.
- A hand lens is useful because some species can be identified with a bit of close examination in the field.
- If you're serious about getting into bees then it is necessary to take specimens because many species will require the use of a microscope to identify. The following list outlines some further equipment that you would need to start your own reference collection:
- ethyl acetate is the most frequently used killing agent (certain types of nail varnish remover will do the trick)
- insect pins
- fine stainless steel tweezers for manipulating legs etc.
- a fine pen and white card for labelling (ready-made labels can be bought), or you can print your labels
- store boxes (these can sometimes be bought second-hand from museums, or you can make your own using plastic Tupperware containers, or cardboard boxes lined with cork/plastozoate)

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Survey methods

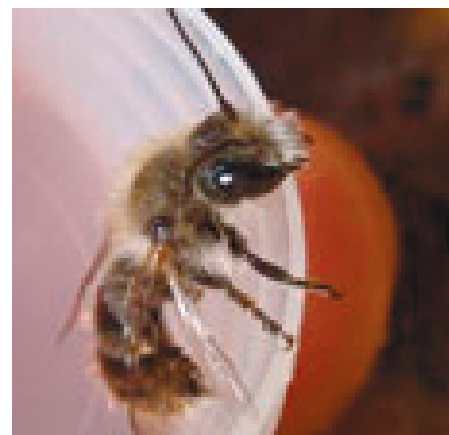
- Perhaps the most obvious method of collecting bees is by targeted netting – you see something buzzing around and you net it. This is a good method for many species, particularly the larger ones but may not be as productive as sweep netting. There will be a lot of by-catch using this method, but it is a good way of catching species that you don't always know are there.
- Water traps are a useful way of surveying bees at sites; the advantages being that they can be left for hours or days and will often yield species that would be missed by direct netting. Florescent yellow plastic pots/bowls/frisbees (any water-tight containers you can get your hands on) seem to work the best for attracting bees. These are filled with a weak solution of detergent, which will break the surface tension of the water to prevent the insects from escaping. These traps work well placed near nesting aggregations and in open areas where they will be more visible to passing bees. In areas of tall vegetation they can be attached to the top of posts to help them stand out, or even on the side of a tree.

Identification

- Firstly, how do you know that it's a hymenopteran?
- There are some very good bee mimic flies so you can be easily fooled into thinking that you have a hymenopteran in front of you when in actual fact it's just a fly... The main difference is that hymenoptera possess two pairs of wings unlike the true flies (diptera) with only one pair.

Male or female?

- Bees are generally fairly easy to sex because many of them will have pollen-collecting hairs (scopa) either on their hind legs or under their abdomen, which will differentiate them from the males. However, it's not always as simple as this because the cuckoo bees will ingest the nectar and pollen instead so will not possess scopa. The most reliable way therefore to separate males from females is from the following characteristics:
- females have antennae with 12 segments, whereas males have 13
- females have an abdomen with 6 visible tergites (technical term for the segments making up the abdomen), whereas males will have 7
- females will have a sting (although this is not always visible) and males will have complex genitalia (again, not always visible). If it stings you, you'll know it's a female!



Male Fringe-horned Mason Bee found at RSPB's Fore Wood, May 2013

So which species is it?

Once you've determined the sex and if it's a bee or wasp you can use an appropriate identification key to find out the species. To start, there are simple keys to genera to be found in the 'Bees of Surrey' book. Once the genus is determined then you can move on to a specific key to find the species (please see the 'useful resources' section)

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Useful resources

- The best place to start looking is the BWARS (Bees, Wasps and Ants Recording Society) site where you will find photos, species descriptions, ID guides and details about recording schemes: www.bwars.com
- The 'Bees of Surrey' book by David Baldock provide an excellent introduction to bees, including straightforward keys to the genera. Surrey harbours a diverse array of bees, so these books are still very useful regardless of which county you live in
- For bumblebees, the BBCT (Bumblebee Conservation Trust) website is a useful resource, particularly for its ID chart: bumblebeeconservation.org. The Natural History Museum also has a useful ID guide: <http://www.nhm.ac.uk/nature-online/life/insects-spiders/bumblebee-id/flash-version/>. A couple of useful field guides for bumblebees are also available: 'Field Guide to the Bumblebees of Great Britain and Ireland' (Mike Edwards & Martin Jenner) and 'Bumblebees: (Naturalists' Handbook)' (Oliver Prŷs-Jones & Sarah Corbet)
- Taking photos of species can sometimes be enough to give you an ID to species level so if you have any photos of species that you're unsure what they are or would like confirmation of what you think they are, then the Open University run site iSpot is a great resource for identifying unknown species. Just post your photos and let the amateurs and experts suggest an ID: www.ispot.org.uk



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