Bee thoughtful

Special Newsletter of the Halifax Beekeepers

August 2020

Track and Trace

Where do your bees go when they leave the hive?

Welcome to the summer edition of the Halifax Beekeepers Association newsletter.

In this packed edition we ask the perennial question **'Where do my bees go?** To which we've got a pretty good answer.

The main focus of this newsletter is to introduce you all to the **National Honey Monitoring Scheme**.

For the relatively simple effort of registering with the scheme and providing them with samples of honey from one of your hives, they will give you a breakdown of the plants your bees have been visiting. All that and much, much more and all for free. Read on!

In other articles, while doing his weekly shopping trips **Roger Pool** has been pondering why bees prefer to visit certain flowers and not others.

Kay Phillips wrestles with the Himalayan balsam dilemma: friend to some, foe to others

Geography teacher **Clive Searle** writes on the importance of Geographical Information Systems and bees in mapping our landscape.

Elaine Robinson has two articles, one where she waxes lyrical about her cappings and the other the surprise of discovering supercedure cells in a hive.

This time ***Where to go for Information*** features the **Dave Cushman** website.

Phil Gee has informed me that Gees Bees shop is now open for all your beekeeping needs, but please respect social distancing rules and wear a face mask when collecting your orders.

Editor: **Richard Searle**, Design & layout: **Clive Searle**

Honey bee on the flower of *Inula magnifca*

Honey bees don't have an issue with native and non-native plants.
Adaptation is the key to their success. It's all about easy access to pollen and nectar

Do bees shop at Tesco?

By Roger Pool

My Dad always referred to his weekly shopping trip as 'foraging'. The 'new normal' shopping, involving a wait to even get into the supermarket, has given me time to consider the comparison between my trip to Tesco and a bee's trip to the flowers.

Bees show brand loyalty

An individual bee will stick to one type of flower until nectar production falls off. For instance, bees working balsam will not visit heather and vice versa.

Opening times are important

Flowers produce nectar at different rates and with differing sugar concentrations depending on the time of day. Dandelions have a maximum in the morning and the sugar content of apple nectar is greater in the afternoon. Bees wait in the hive until the optimum time for visiting their allocated flower variety.

The entrance is familiar and attractive

Flower colours toward the blue end of the spectrum are most attractive and learning occurs more rapidly for these colours. The flower may provide nectary guides, often best seen under UV light, as additional signage pointing to the nectar source. Bees learn how to navigate the way into their chosen flower.

Moving objects attract attention

Bees have remarkably poor vision. Flowers that wave in the breeze gently are more attractive than either flowers that don't move or move too much.

The entrance is designed to prevent slipping

Under very high magnification the surface of a petal is seen to resemble a cobbled road reducing the risk of a bee falling off the petal when landing.

Attractive smells encourage visitors

The attractive scent of the flower is produced by specialised parts of the petals and helps attract bees that have many thousands of smell receptors particularly concentrated on their antennae. The bee learns the scent of the nectar source.

Shopping is better after coffee

Some flowers add a small amount of caffeine to their nectar. This seems to improve bee's memory of the location of the flower and encourages bees to return even if the nectar supply has reduced.

Continue reading at the bottom of page 4

Do bees shop at Tesco?

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You get more than you came in for

Nearly half of the foraging force is dedicated to bringing in nectar. Flowers have evolved designs that cause nectar seeking bees to also become covered in pollen which is then transferred to other flowers resulting in fertilisation.

Customers are informed about discontinued lines

Once the flower has been fertilised nectar production stops. Flowers have various ways of signalling to bees that further visits are unnecessary. E.g. the centre of forget-me-nots change from yellow to white.

Customer satisfaction is important

Bees returning from a good nectar source will communicate this to other foragers by performing a much more vigorous waggle dance with an increased number of 'laps'.

Happy foraging to you all!
Best wishes, Roger

Himalayan Balsam - Hero or Villain?

By Kay Phillips

I must admit to feeling somewhat conflicted when a message popped up on my Facebook page – those nice 'Slow the Flow' people encouraging us to get involved with 'Balsam Bashing: the 8 Point Plan' – how to organise local balsam bashing events and share the photos or videos on line.

"Oh No!" I thought. "How can this be happening?"

These are the lovely folks who work so hard to stop us flooding by building lots of small leaky dams in streams higher up the valley to slow the flow into the valley bottoms. These are good people.

Don't they understand how important the balsam is for our bees? Such a good source of nectar and really late into autumn as well - until the first frosts in fact. Such pretty, pink flowers which are edible and can be added to salads or to make beautiful ice cubes. The seeds are also edible, nutty tasting and a good alternative for those with nut allergies – flavour somewhere between walnut and hazelnut. They can also be crushed and used instead of ground almond. Even the stalks can be used as non-plastic straws. What's not to like?

When our bees come back to the hives with a mysterious white stripe on their heads, they haven't got some strange disease - it's the Himalayan Balsam pollen which rubs off on them as they exit the flower. So many bees have white stripes at this time of year that it's easy to see how many of them are visiting the Balsam. They create a lovely light


Balsam in bloom

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Himalayan Balsam - Hero or Villain?

floral honey from the nectar.

Himalayan Balsam (Impatiens Glandulifera) is a large annual plant, native to the Himalayas. It has many other names - including Indian Balsam, Policeman's Helmet, Jumping Jack, and Kiss-me-on-the-mountain. It was introduced to the UK in 1839 as a greenhouse annual, but quickly escaped into the wild. The name 'Jumping Jack' refers to the way the seed pods explode on touching, propelling the seeds several metres at a time, hence spreading the plants very effectively. 800 seeds per pod! It likes to have 'wet feet', so it grows well in Britain, and especially so in Yorkshire.

***Impatiens glandulifera*. The genus name *Impatiens*, meaning "impatient", refers to its method of seed dispersal. The species name *glandulifera* comes from the Latin words *glándula* meaning 'small gland', and *ferre* meaning 'to bear', referring to the plant's glands, including nectaries.**

The Nineteenth Century explorers and plant gatherers, responsible for introducing Himalayan Balsam to the UK, also brought Giant Hog Weed and Japanese Knotweed around the same time. They were impressed by their size and vigour and thought the Knotweed could be used to help strengthen riverbanks or railway sidings. All three plants are now officially considered to be

Marked with balsam pollen (centre)

'infestations', and it is an offence to plant or otherwise cause them to grow in the UK. Of this wicked gang of three, the Balsam does seem the least offensive - at least it won't destroy the foundations of your house or poison you with toxic sap.

The main problem with the Balsam is how well it grows, and how it can prevent other native plants from thriving. The shallow roots do not help to shore up the riverbanks, and the plant dies back in the winter, so exposing the bare soil, so causing susceptibility to soil erosion. The native plants, which would have helped maintain the riverbank, are no longer there. This can cause damage to waterway habitats such as fish spawning grounds. It's thought it may increase flooding risks in summer by constricting water flow and in autumn/winter by increased amounts of plant material entering the waters.

Exiting the balsam flower

So, hero or villain? Maybe the answer is neither a complete hero nor a complete villain? More of a conundrum?

It still feels like a bit of a dilemma to me, but I feel reassured looking around the countryside in recent weeks. Whilst there are big piles of bashed up balsam by the sides of roads, there is still plenty of balsam growing, and lots of bees coming back to our hives with the not-so mysterious white stripes.

Anyone for Melissopalynology?

by Richard Searle

*'**Melissopalynology** is the study of pollen contained in honey, and, in particular, the pollen's source. By studying the pollen in a sample of honey, it is possible to gain evidence of the geographical location and genus of the plants that the honey bees visited. In general, melissopalynology is used to combat fraud and inaccurate labelling of honey.'* **Source: Wikipedia**

A constant feature of beekeeping is wondering where your bees are foraging. Sometimes it's obvious, as with Himalayan Balsam, as your bees return to the hive with the obvious ghostly stripe on their backs. At other times it's a reasonable certainty, such as the start of the season when only a few plants or trees have pollen available, such as crocus or willow

For all the other times there is educated guess work, with perhaps the assistance of a pollen chart of dubious printing quality and the stand by answer of 'Sorry, but I haven't got a clue.'

Solving the mystery of where your own bees have been foraging is now one step closer. So let me introduce you to the **National Honey Monitoring Scheme** (NHMS). The scheme will tell you what your bees have been foraging on with a series of excellent tables and charts.

Registering for this service is easier than pronouncing melissopalynology, let alone spelling it. Moreover, they will do all this for free.

Signing up for the scheme would take about the same time as reading this article. All that is required is you log on to their website at www.honey-monitoring.ac.uk and follow a few simple steps.

- Register your details.
- Then click on the button labeled **Taking part.**
- Drop a pin on a map where your hives are located.
- Then, hey presto! You get sent a packet in the post with two small sample containers..
- All you need to do then is fill them both up with honey from a capped frame from one hive, and pop them into the stamped addressed envelope that they have also provided.

Yes, that's it. Well you have to walk to the post box, but essentially that is it.

You can add some extra details about the hive you took the sample from in a short on-line questionnaire. Then a few months later the results from the analysis of your honey samples are posted on-line in your registered account. You will be notified of this by email.

The results are displayed in diagrams and charts, which you can download as a pdf.

Not only do you get detailed results of the flowers that your bees have been visiting, you also have that warm glow you get from contributing to important scientific research.

To show how the information is displayed, I have included (pages 9-13) the results of the analysis from a hive in Old Town. The apiary sits at an altitude of around 900 feet on the north side of the Calder Valley. The results are for honey from 2019.

The NHMS scheme website even has some short videos on how to take the sample and a whole bunch of other useful advice.

When I contacted the NHMS, and informed them that we would be making the National Honey Monitoring Scheme a focus for our summer newsletter, Dr Anna Oliver, a molecular biologist from the scheme replied, **"Thank you for deciding to make us the focus of your newsletter to encourage even better uptake. We could not do this important environmental research if it was not for people like yourself."**

The National Honey Monitoring Scheme

'Using citizen science to understand the foraging habits of UK honeybees.'

by Dr Anna Oliver

Senior molecular biologist working on the National Honey Monitoring Scheme at the UK Centre for Ecology & Hydrology (UKCEH), Wallingford.

The scheme, backed by both the British Beekeepers Association (BBKA) and the Bee Farmers Association (BFA), was set up in July 2018 and aims to monitor how the foraging habits of UK honeybees respond to a changing environment. Further, if these changes can be used to provide information on the health of our countryside. It is the first UK-wide analysis of its kind, and uses advanced DNA barcoding techniques to identify traces of pollen in honey. The scheme comes at a time when many species of insect pollinators are in decline in the UK.

There is a lot of concern about declines in insect pollinators, which provide a vital service to humans in crop production and are also essential to the survival of many species of wildflowers. However, they are facing a number of threats, including loss of habitats, climate change, pesticides and disease.

Bees, through their honey, provide a window into the health of our countryside, enabling us to monitor the impact of environmental change. Therefore, we are very grateful for the support of UK beekeepers who have, and continue to supply samples for this important scheme.

2018 saw 200 beekeepers from across the UK participating and identified plants favoured by honeybees, regional differences in foraging habits as well as showing the importance of some invasive plant species. 2019 was an even better year with almost 600

beekeepers having submitted honey samples for analysis and the results generated clearly indicated forage patterns linked to both time of year and land use. These data are being prepared for publication in a scientific journal, after which time they will be made publically available.

This year, despite COVID-19 restrictions, sees the NHMS going from strength to strength. As of mid-July, over 1000 sample packs have been requested and almost 400 returned- more than double this time last year. We are thrilled and excited to see what the results show.

Samples are being collected throughout the honey season for analysis. Packs can be requested until October. Any samples returned after November will be archived only. Beekeepers who want more information or to take part in the scheme can email honey@ceh.ac.uk or visit https://honey-monitoring.ac.uk

UK Centre for Ecology & Hydrology

About UK CEH and the Honey Monitoring Scheme funding

The UK Centre for Ecology and Hydrology (UKCEH) became an independent, not-for-profit research institute in December 2019 and is now autonomous from UK Research & Innovation and the Natural Environment Research Council.

UK is a centre for excellence in environmental science across water, land and air. The organisation has a long history of investigating, monitoring and modelling environmental change, and its science makes a difference in the world.

The Honey Monitoring Scheme is supported by national capability funding under the ASSIST programme. National capability funding is provided to UK CEH directly from the UK Government to support long-term, large-scale monitoring of environmental change in the UK.

Printable results

Honey sample characteristics

Results for sample ID 5952173

Date of honey sample	20/06/2019
Map reference	SD99792852
Sugar content measured in Brix (%)	81.1
Density BE @ 20°C	42.8
Moisture content (% H_2O)	17
Comments	

Honey has an effect on light and this property can be adapted to help characterise the quality and even type of honey. Variations in honey water content can been seen through changes in the refractive index, or RI. Refractive index measures the difference in how light passes through honey and through a vacuum.

RI is measured through the use of a refractometer, the measurement taken can also give rough estimates water and sugar content of the honey. The amount of sugar is measured using a Brix scale, where roughly 1 brix = 1% sugar, so a Brix value of 80 = 80% sugar. Honey is typically measured as between 70-88 %. Ideal water content of honey should be less 17.8% as it's likely that anything above 20% will allow yeasts to ferment and spoil the honey. However, if the moisture content is too low then honey will likely crystalize.

Additionally this device will also give a rough estimation of specific gravity (liquid density), measured by the Baume scale (BE).

IMPORTANT:

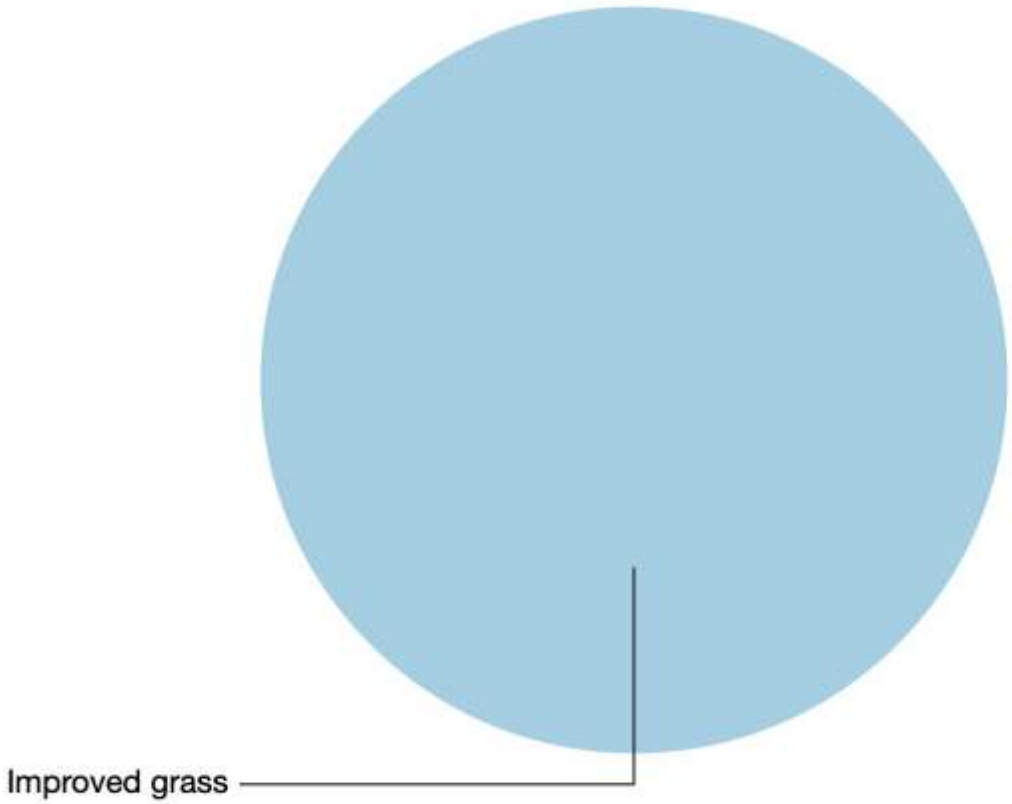
Our measurements are taken on a handheld refractometer and therefore values given are for your interest only.

It should also be remembered that since honey is hygroscopic, if a container isn't properly sealed water will get into the honey and affect readings. Values given may not be a true representation of the sample provided.

Habitats and crops surrounding beehive (a 2km radius)

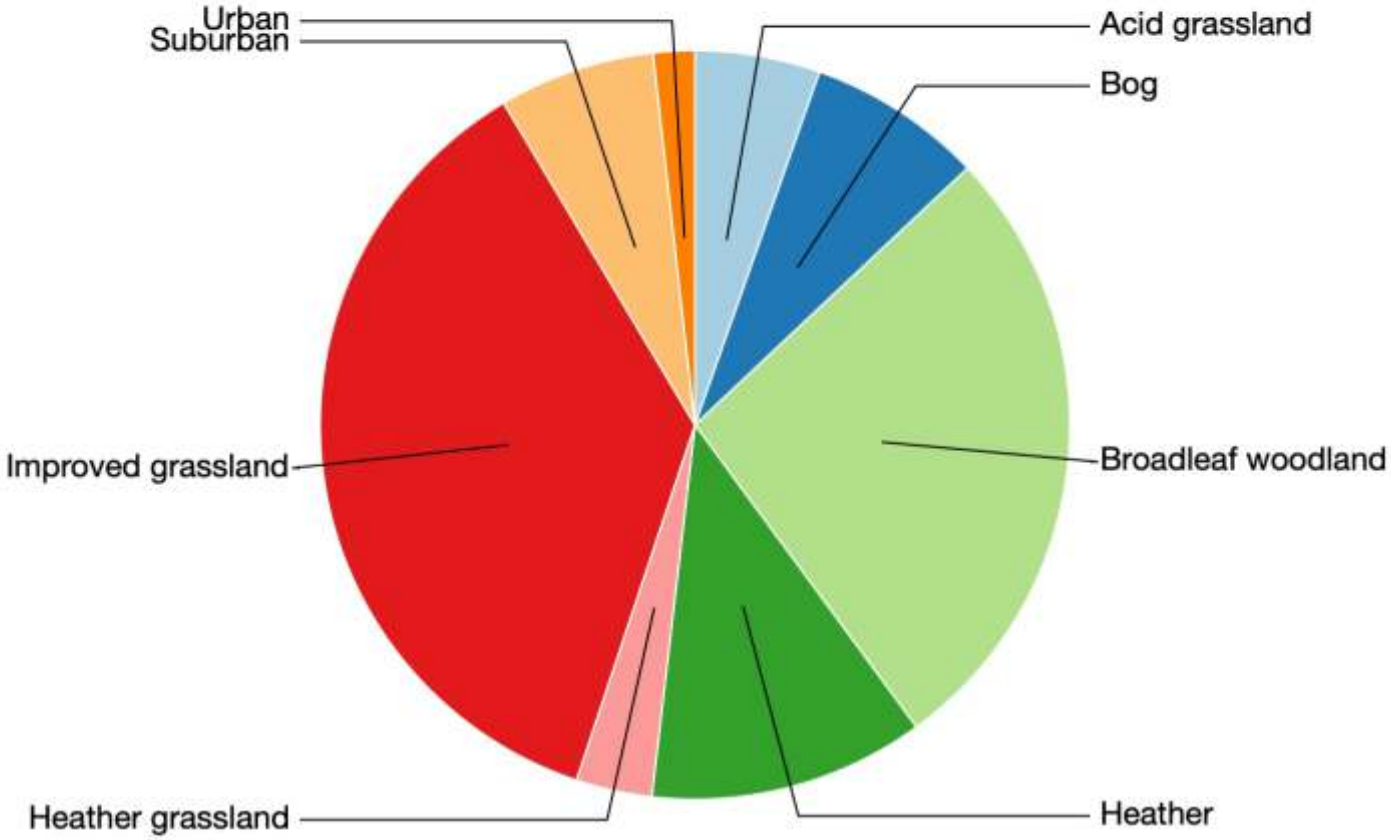
Crops surrounding beehive

The total area of crop or improved grassland habitat in a 2km radius surrounding the hive is 0.7 km^2 (5%). The pie chart below shows the percentage breakdown by crop type/improved grassland.



Habitats surrounding beehive

The pie chart below shows the percentage cover of all broad habitats within a 2km radius around the hive.



The sample analysis also shows areas of land cover of the following types which were too small to show on the pie chart:

- Calcareous grassland
- Coniferous woodland
- Freshwater

Sample species results

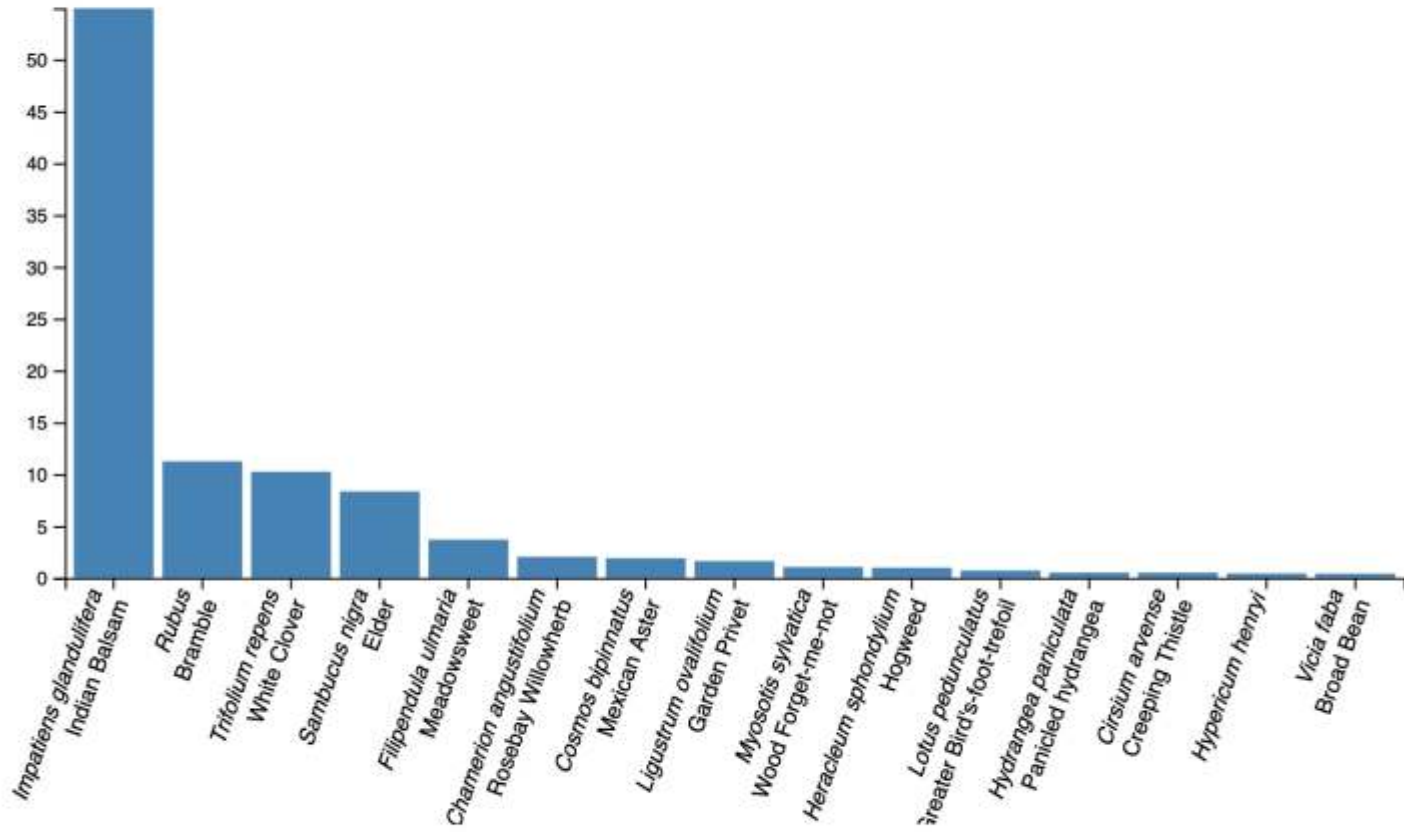
Plant identification using DNA barcoding of honey samples is reliant upon sequencing a small, specific area of DNA.These are then compared to a large database of reference sequences to identify the likely plant species present.Accurate identification to a very fine taxonomic level is not always possible, particularly for some groups (E.g.Brassicas).

We also provide an estimate of relative abundance of each species (or higher taxonomic levels) present in a honeysample, based on the quantity of DNA fragments present. Although the ordering of plant species by this measure is likelyto be representative of honey composition, molecular technique are not directly equivalent to traditional microscopybased upon melissopalynology. Estimates of relative abundance from molecular techniques are not directly equivalent totraditional pollen counts. No pollen coefficient values have been applied and therefore these data cannot be used forhoney verification purposes.

Sample summary

Total taxa in the sample	25
Proportion of total sample for the top 15 most abundant taxa	0.99

Top 15 most abundant taxa in the sample



Complete list of taxa in the sample

Species scientific name	Common name
Impatiens glandulifera	Indian Balsam
Rubus	Bramble
Trifolium repens	White Clover
Sambucus nigra	Elder
Filipendula ulmaria	Meadowsweet
Chamerion angustifolium	Rosebay Willowherb
Cosmos bipinnatus	Mexican Aster
Ligustrum ovalifolium	Garden Privet
Myosotis sylvatica	Wood Forget-me-not
Heracleum sphondylium	Hogweed
Lotus pedunculatus	Greater Bird's-foot-trefoil
Hydrangea paniculata	Panicled hydrangea
Cirsium arvense	Creeping Thistle
Hypericum henryi	
Vicia faba	Broad Bean
Calluna vulgaris	Heather
Rubus kuleszae	
Lythrum salicaria	Purple-loosestrife
Biota	
Plantago lanceolata	Ribwort Plantain
Hydrangea	
Eruca vesicaria	Garden Rocket
Digitalis purpurea	Foxglove
Scorzoneroides autumnalis	Autumn Hawkbit
Sedum rupestre	Reflexed Stonecrop

Science got a brand new workforce

By Clive Searle

One of the most exciting developments in computing over the last few years has been the evolution of Geographical Information Systems (GIS). GIS allows for large data sets to be displayed spatially on maps and 3D scenes at a variety of scales. While the human mind struggles to comprehend information contained in endless tables, it is remarkably adept at identifying patterns when that data is displayed visually.

Since several data sets can be displayed on the same map in layers, it is easier to spot correlations, monitor change and identify problems as well as apply solutions.

Today GIS is used for everything from traffic management to crime prevention, from identifying disease hotspots to the location of a new supermarket. As computers become more powerful, so GIS becomes an even more valuable tool.

But one problem remains: you still have to collect the data and this can be very expensive. The 2021 census is likely to cost the UK somewhere in the region of £1 billion. The fact that data is expensive to collect also makes it valuable. Hence the importance supermarkets place on their loyalty cards, or the ever-growing share value of companies like Facebook.

Citizen science: off in the post

Collecting your honey sample

For biologists or geographers needing to collect 'fieldwork' data, the solution to the expense problem was often a legion of PhD post-graduates spending hours in the field.

What makes the **National Honey Monitoring Scheme** so exciting is that a new research team of up to 40,000 workers can be recruited for each sample site: your bees.

State of the art DNA 'barcoding' analyses the pollen grains in honey. When this data is married to land-use and vegetation maps created from satellite imagery, honey can provide information about our changing environments, both rural and urban. Honey collected earlier in the year and compared with late season samples will show how foraging patterns change in a single year. Changes in land use, farm crops and farming practices, as well as gardening trends can be identified and evaluated by the impact they have on the foraging of pollinators.

Over 1,000 different species and families of plants have been identified as being visited by bees in UK. London has the most biodiverse honey in the country with samples containing an average of 45 types of pollen - compared to a national average of 28.

The spread of invasive species like Indian balsam or the notorious 'tree of heaven' (*Ailanthus altissima*) can be mapped. Honey samples have also shown the prevalence of neonicotinoid pesticides, (especially those samples with high concentration of oil seed rape pollen) even after the EU-wide ban on their use. This is of serious concern due to the long-term impact these chemicals can have on pollinating insects.

The more bee keepers who sign up for the scheme, the greater the depth and breadth of the data collected and the longer the scheme continues the greater our understanding of environmental change will be.

Dr Anna Oliver, a molecular biologist at the Centre for Ecology & Hydrology, commented. "Bees, through their honey, provide a window into the health of our countryside, enabling us to monitor the impact of environmental change. Therefore, we are very grateful for the support of UK beekeepers who have supplied samples so far for this important scheme and we hope more of them will sign up to submit honey for analysis this year."

Don’t let that wax go to waste

by Elaine Robinson

In the Spring edition of the Newsletter I showed how to recycle old brood frames, using a Thornes Easi steam, available to hire from HBKA. This edition, I'll demonstrate how to clean up and recycle brace comb collected from your inspections and cappings from honey extraction, using a small steamer also available for hire from HBKA.

All you need aside from the steamer and your wax collection, is a sieve, an old pair of tights and a few containers to collect the wax in

Step 1

Wash wax thoroughly in cold water, best through a sieve.

Step 2

Pack the cappings into the legs of an old pair of tights & drip dry.

Step 3

Fill the bottom section of the steamer 2/3rds full with water, taking care through the process not to boil dry.

Step 4

Add cappings into the inner steamer basket.

Step 5

Add lid and switch on the steamer. Position containers beneath the steamer spout. Wait for water to boil.

Step 6

As the wax melts, it gradually flows from the spout where it can be collected. N.B. Keep an eye on the steamer, rather than leaving to do household chores!

Recycling your waste wax *continued from page 14*

Step 7

After the wax has set and the containers feel cold (overnight to be safe), simply tip the containers over a sink, to release the wax. Depending on how well you washed the cappings before adding to the steamer, your wax may be floating on some residual honey. Simply pour / wash off and scrape any 'dross 'on the bottom of the wax that managed to get through the tights, with a hive tool.

Your recycled wax is now ready for further filtering, by gently melting and straining using j cloths and lint. You can then use your filtered wax for making candles, wax blocks, beeswax food wraps and cosmetics. Possibly entering some of your products in the HBKA wax classes at the Halifax show next year!

For full details how to hire this equipment, or the Thornes Easisteam brood wax recycling kit, see the HBKA website.

Don’t panic! It's a supercedure cell

by Elaine Robinson

Supercedure of queens is fairly common at this time of year and is a colony’s way of righting a perceived problem with their existing queen. This can be down to the age of the queen with less pheromones being produced, or something wrong with the queen such as physical problem or perhaps she was poorly mated.

Typically supercedure cells appear as one or up to three cells on the face of the same comb, all evenly aged and are built from eggs laid by the existing queen in 'play cups', like swarm cells. Emergency cells in contrast, are built from worker cells in a panic situation when a queen is lost or balled by worker bees, or accidentally killed by the beekeeper. These can be seen at a range of ages from open to sealed anywhere on the combs. They are rare in the wild, so usually created by the actions whether deliberate or accidental, by the beekeeper!

Best not to panic and take a supercedure cell down, it's a natural process with the bees trying to right a problem. If you spot one, slowly work through the colony to confirm that's what's going on, then leave well alone. If you do take one down, it's likely the colony will simply build another. There's no need to reduce to one, at this time of year bees are unlikely to swarm on supercedure cells and they will select the best queen.

There's still time with lots of drones still around to get mated well and produce a new queen going into winter, that will be more robust and fecund that an older queen.

Supercedure queens are said to be the 'best' type of queen, as the bees are focussing on just one or two cells, so really well fed with royal jelly.

Often the existing queen will be present alongside her daughter queen, until both are laying when the colony will either stop feeding the older queen or the colony will dispatch her. Hence the term 'perfect supercedure' and this trait in colonies is sought after by queen rearers. It's a good reason to mark your queens, so if you see an unmarked queen in your colony in the spring, rather than a marked one, you know she's a supercedure queen.

Spot the supercedure cell

Where to go for information

The Dave Cushman website is a huge resource that is considered by many to be the world's most comprehensive and authoritative beekeeping website.

On first appearances this website does not have the most modern interfaces, but then again Tutankhamen's tomb did not look all that special from the outside. But just like Tutankhamen's tomb this website is a veritable treasure trove.

Although Dave Cushman passed away in 2011, the website is now maintained by well-known beekeeper, Roger Patterson.

www.dave-cushman.net