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The Buzz Club Newsletter

University of Sussex

Inside this issue:

The second issue of the Buzz Club newsletter has arrived. We hope to help answer important questions about insects and bees, whilst encouraging everyone to learn more about and take an active part in scientific research. Our second quarterly newsletter contains news about a new bee genus found in Portugal, lots of exciting news on recent research done in the field of insect and pollination ecology as well as updates of current projects our members can join.

This issue is edited by Dr. Saija Piiroinen (below). Each issue will be edited by a different member of the team.

Hot off the Press! Neonicotinoids in Wildflowers

By Dr Cristina Botías

As part of the research project undertaken in the Goulson lab, funded by Defra, to investigate the concentrations of neonicotinoid insecticides that bees are exposed to when they forage in UK farmland, we have done a thorough environmental sampling of farms in East Sussex. This included pollen and nectar samples collected from neonicotinoid treated oilseed rape plants and wildflowers growing in the field margins of treated arable crops, and soil samples from beneath the vegetation. We also placed honeybee colonies on these farms and gathered the pollen returned to the hives to estimate the levels of exposure when they forage in farmland.

Our results show that mixtures of neonicotinoids are frequently present in the pollen of wildflowers growing in crop field margins, at concentrations that are sometimes even higher than those found in the crop. We also found that a large majority of neonicotinoid residues contained in the pollen collected by honeybees came from wildflowers (97%), while only 3% came from oilseed rape pollen, confirming an alarming level of contamination of non-target vegetation in agricultural landscapes! Neonicotinoids were consistently found in the soil at the edges of fields and we therefore think that this is the most likely source of wildflower contamination, and that the water-soluble neonicotinoids travel from agricultural fields into the soil beneath wildflower strips. Meant to be clean refuges for pollinators, wildflower buffers instead might have become sources of pesticides. Sadly, our findings indicate that exposure could be higher and more prolonged than currently recognized, since bees would be exposed to these compounds not only when neonicotinoid-treated flowering crops are in bloom, but for their entire foraging period (spring/summer) when wildflowers of one type or another would be in bloom.

Find more about our study in http://pubs.acs.org/doi/abs/10.1021/acs.est.5b03459.

New Bee Genus Found in Portugal

A new species *Biastes brevicornis* (Panzer, 1798) has just been discovered for the very first time in Portugal by one of our team! It is the first representative of the genus *Biastes* for the country. This exciting finding is part of Andreia Penado's PhD in which she aims to understand the impacts of climate and habitat use on Iberian bees. Andreia has been collecting bees in the north of Portugal and has provided new and interesting records in a country where there is little knowledge of native bees. She hopes to change that soon!

Biastes brevicornis. Photo: Henrik Gyurkovics

"Who" is *Biastes brevicornis*?

This bee can be found from the Iberia Peninsula to Kazakhstan (not in the UK). It is a parasitic bee (or cuckoo bee) on *Systropha* bees (another genus of solitary bee) which means that *Biastes* does not build nests nor collect pollen for their brood, but instead *Biastes* bees lay their eggs on *Systropha* nests. Nevertheless, *Biastes* are not the only bees that are parasitic. We can find other parasitic bees that prefer this "lazy way" to raise their brood. For example, some species of bumblebees behave similarly to *Biastes* (e.g. the southern cuckoo bumblebee, *Bombus vestalis*).

The poor host, *Systropia planides*. Photo: Alain C. via Flickr CC BY-NC-SA 2.0

Are Neonicotinoids Killing Our Butterflies?

By Prof Dave Goulson

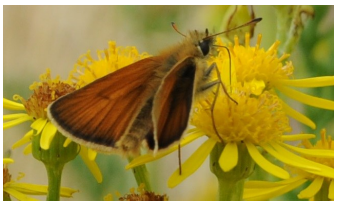
Neonics have attracted lots of attention in recent years because of a growing body of evidence that they may be harming bees. Unfortunately, evidence is growing that their impacts on bees may just be the visible tip of the iceberg. These persistent neurotoxic chemicals get into the pollen and nectar of treated crops, but also contaminate wildflowers growing nearby, as we recently discovered. If they are in the flowers growing in field margins and hedgerows, then any insect eating those plants might be affected – such as the caterpillars of butterflies and moths, or grasshoppers and froghoppers.

Small tortoiseshell, *Aglais urticae*

In a joint project with Stirling University, Butterfly Conservation and the Centre for Ecology & Hydrology we set out to examine this. We analysed long-term data on population change in widespread farmland butterflies in relation to patterns of increasing neonic usage. An alarming pattern emerges – of the 17 butterfly species we looked at, declines in 15 of them are strongly correlated with the amount of neonics applied to the landscape, even after taking into account effects of weather. The relationship between neonic usage and decline were particularly strong for species such as the wall butterfly, small skipper and small tortoiseshell. These are all butterflies that were very common when I was a boy, but are now much more scarce.

We can't be 100% certain that these declines are due to neonics – it is possible that some other aspect of farming that is very strongly correlated with neonic use could be the true driver. But it is hard to think of any other farming change that has occurred over the same period (1994-present) that could realistically be driving butterfly declines. The study also notes that these same butterflies have not declined in Scotland, where neonic usage is negligible compared to England.

We have good data for butterflies, but sadly very few data on population change in other insect groups. Yet other types of insect are just as likely to be affected as butterflies. This is one of the reasons why we really need the monitoring schemes that the Buzz Club is running – so that we can see what is happening to populations of all our pollinators and other insects. The better we understand which species are declining, and why, the more chance we stand of being able to do something to help them – in this case by pressing for more restrictions on use of harmful chemicals.



Small skipper, *Thymelicus sylvestris*

This study was published in the journal PeerJ on 24 November 2015, and is freely available to download from the journal: https://peerj.com/

Hot off the Press! Pine Hoverfly Study

By Dr Ellen Rotheray

A study on the pine hoverfly, *Blera fallax*, one of Britain's rarest insects, has just been published: the inspiration for the Buzz Club's Hoverfly Lagoon project. The research focussed on rearing conditions i.e. different lagoon substrates, and how these might affect the development of larvae. We found that the size and shape of the organic substrate in lagoons can affect larval growth (large wood chips aren't as productive as sawdust) which is probably related to the number of bacteria that grow on the surface of these substrates upon which lagoon-dwelling larvae filter feed. The study also found that there is competition for resources in lagoons, and in nature resources are limiting. We can use what was learnt in this study to continue to test the effectiveness of different types of lagoons for attracting different species of hoverflies in our Hoverfly Lagoon project.

Blera fallax, the pine hoverfly.

Current Project Updates

Pollinator Abundance Network (P.A.N.)

The second year of our Pollinator Abundance Network (P.A.N.) project (the first official project under the Buzz Club banner) was undertaken in summer 2015. We had 82 people sign up to participate, and we have been receiving the samples back over the last few months. It is now down to us to process all the samples and identify the pollinators that are present in your gardens/allotments. This is a long process which may take a few months, but we hope to have it completed by early 2016. Once this is done, we will be able to send a summary of the results to all the participants. Thanks again to everyone who took part. Although some of you may have caught only a few insects, these are still potentially valuable records which we plan on adding to national records.

Hoverfly Lagoons

The Hoverfly Lagoon project has got off to a great start! Of 65 pupae collected from around the lagoons we have installed on the Sussex University campus, 2 emerged as *Helophilus pendulus*, 21 as *Myathropa florea*, 17 as *Eristalis* spp., and 6 were empty pupae so were unknown hoverfly species. Silage appears to be the most productive lagoon substrate from this summer, providing enough food for 34 hoverfly larvae to develop to pupation, however 15 of these were parasitized. The pupae found parasitized were mostly grouped together at the surface of the leaf litter – easy pickings for a parasitic wasp, which attacks the defenceless pupae. While parasitoids don't support our primary goal on this project – to boost hoverfly populations - they play an interesting and important role in nature, and they enhance the insect biodiversity in our gardens. But perhaps our lagoons need to be tweaked to keep parasitisation to a minimum.

Hoverfly pupae found with parasitoids

The results from the start of our winter surveys are in! Several species of hoverfly, such as *Myathropa florea* and *Helophilus* spp. will overwinter in the lagoons as larvae, and pupate and emerge as adults in spring the following year. Of eight, 3-litre lagoons in one garden we found a whopping 556 long-tailed larvae, thick with white fat stores for the winter. Woodchip was particularly good, homing 145 larvae in one lagoon, and we counted 122 and 99 larvae in one sawdust and silage lagoon respectively. We will monitor these lagoons for overwinter survival, and rear some through in the lab to identify to species. Now we just need to use what we've learnt this year and develop our protocols for maximum hoverfly productivity next year. Watch this space for new and improved lagoon methods, 2016!

Long-tailed larvae ready to overwinter

Pollinator Corner -Winter Foraging Bumblebees

By Dr Rob Fowler

During the colder months most solitary bees overwinter as adults in cocoons or pupae, ready to emerge when things warm up in the spring. Bumblebees are slightly different however, with new queens lying dormant in soil, compost heaps or disused rodent holes throughout winter, and in the warmer parts of the UK actually founding colonies throughout the winter months. Occasionally, it is possible to see bumblebees out foraging for a quick sip of nectar, especially on sunny winter days. The most commonly observed winter bumblebee is the Buff Tailed Bumblebee (*Bombus terrestris*).

With more exotic species planted in gardens and amenity areas, the chances of seeing nectaring bumblebee queens in the winter months is on the up! The plants they tend to feed on include *Mahonia* (pictured), *Viburnum x bodnantense* and winter honeysuckle, so if you want to provide winter forage for bees these plants are your best bet.

If you have seen any active bumblebees, please tweet us @The_Buzz_Club and record your sightings on the Bees Wasps and Ants Recording Society. This is quite important as scientists are trying to determine if winter foraging/ colony founding is mainly restricted to particular areas of the country, whether particular species are more likely to forage during the winter, and if the occurrence of foraging during winter is related to the types of winters we have.

Mahonia, a plant nectar-seeking bumblebee queens like to feed on in the winter months

Images from our readers

If you have any pictures or interesting experiences with insects or pollinators please feel free to send them to buzzclub.uk@gmail.com, or tweet to us @The_Buzz_Club and we will add them into our newsletters.

The Buzz Club @The_Buzz_Club Oct 9

One keen participant has already made these fantastic bee hotels! Sign-up now to get started http://goo.gl/aLD93I

The Buzz Club @The_Buzz_Club Sep 27

Explaining the importance of solitary #bees as orchard #pollinators using our observation nests #appledaybrighton

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We are a group of scientists and non-scientists, adults and children, working together to find out more about bees and other pollinators. The Buzz Club's goal is to ensure that we look after our wild bees and other insects, giving them a future. We can only do this if we understand more about them; why are some disappearing, how many are left, and where are they? How fast are they declining? What can we best do to help them? Together, we undertake fun nationwide surveys and experiments.

Visit our website

www.thebuzzclub.uk

Help us study and save pollinators!!