Buzz Club Newsletter

Welcome to the 2023 edition of the Buzz Club's yearly newsletter! It has been a big year for changes in the Buzz Club, with Issy joining Linda on the Team and a big overhaul of the website. We're active on Instagram now; have started a program of online webinars for highlighting our work and research; added new projects and a new *style* of projects to our repertoire. Plus we are recruiting a members' working group and local facilitators to better work *with* our volunteers on our future plans.

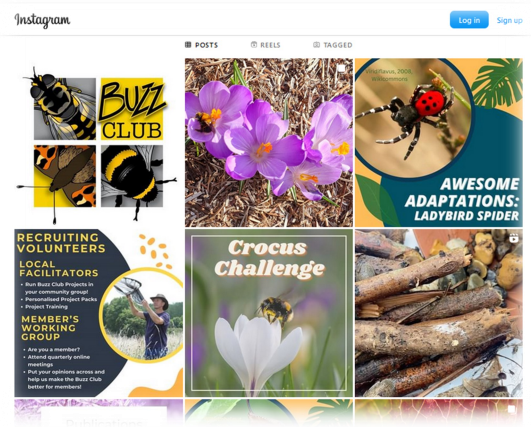
Inside this issue:

Events and Webinars

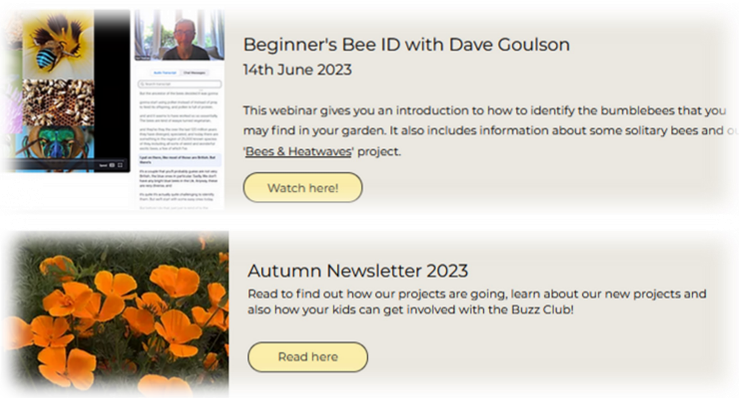
We have run five webinars this year, all of which were recorded and are available free on our website:

1) Beginners Bee ID with Professor Dave Goulson
2) Insect Mythbusting with Dr Linda Birkin
3) Insect ID with Issy Sexton (2x)
4) Marvellous Miners: A Retrospective

We have more of our own online talks planned for next year — and we have also teamed up with the Biological Recording Company to deliver webinars as part of their EntoLIVE series. These are open for booking now: https://www.eventbrite.com/cc/entolive-webinars-74679.



We are @the_buzz_club on Instagram



All monthly newsletter and webinar recordings are on the website, so you can catch up anytime!

Air Bee 'n Bee

Investigating if there is a 'best' way to make a bee hotel.

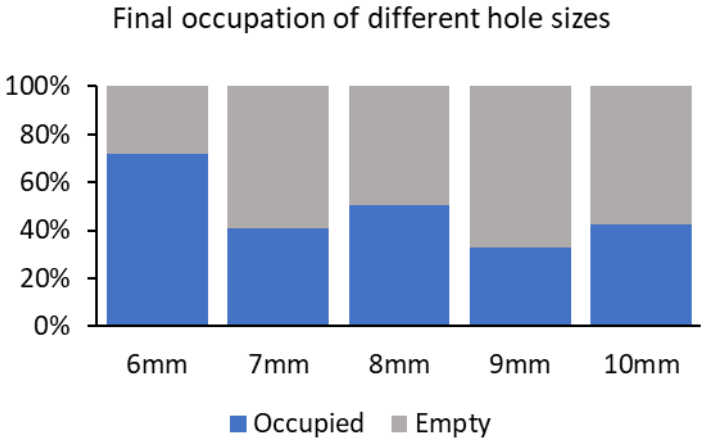
'Bee hotels' designed for solitary, cavity-nesting bees tend to contain holes of approximately 8mm in diameter. This varies if natural materials are used, such as bamboo canes or bundles of hollow stems, but for drilled-block style hotels, 8mm is usually the advised size. This project investigated using different hole diameters to see if it attracted different types of bee, since solitary bees come in many different sizes!

Linda's bee hotel

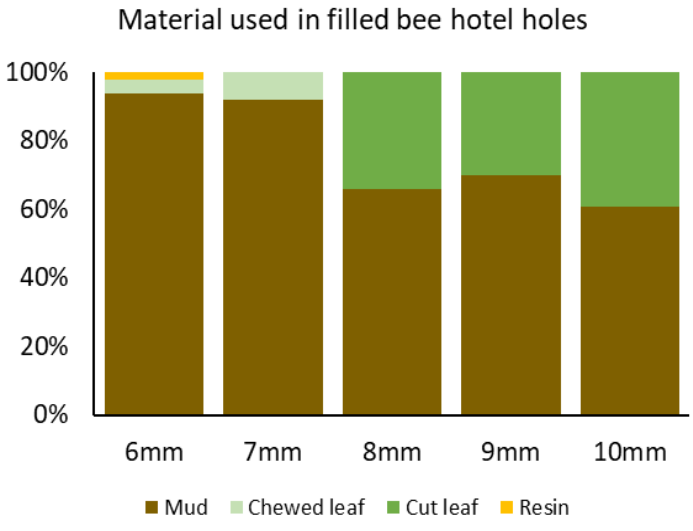
Participants randomised and drilled holes of sizes 6, 7, 8, 9, 10mm in wooden blocks, put up the hotels, and recorded occupancy weekly from April—September. 324 hotel rooms (holes) were set up, and **156** of them were used by bees (48%) by the end of the project.

The 8mm holes were fairly popular, with 50% occupancy across all hotels—but the **most commonly occupied size** were the **6mm** holes (71% occupied). The 6mm holes also had the most types of filling used, suggesting interest from mason bees (large *Osmia* species that use mud), lesser mason bees (smaller species that use chewed up plant material and dirt) and resin bees (very small bees the use plant resin).

The earliest bees to arrive were the mason bees and they were the least fussy about their accommodation; although seemed to prefer 6-8mm holes compared to the 9-10mm. The blue masons came later in the year and seemed to prefer the smaller holes, found only in 6-7mm holes (even though 8+ were available). Leaf-cutters arrived last, only using larger hole sizes 8-10mm.



From participant observations, the hotels were also visited / used for resting by jewel wasps and ichneumonid wasps (potentially looking to prey on the bees), yellow-faced bees, and *Ectemnius* digger wasps; as well as males of all the species using the hotels, sheltering or waiting for appropriate females.



Other visitors investigating or using the hotels included 'Houdini flies' (*Cacoxenus indagator*), a fruit fly that is a kleptoparasite of mason bees; Opiliones and spiders; woodlice; a few earwigs*; and small birds pecking into the capped tubes for a quick snack.

which really would go **anywhere except the Earwi'GO! hotels this year, apparently...*

Visitors to the bee hotels

Mason bees and leafcutter bees. The most commonly-found bees using our hotels. Mason bees are spring bees, appearing around March, and leafcutters much later in April / May. Several participants in Air Bee 'n Bee found that the mason bees filled up their bee hotels very fast, leaving no space for the later-flying bees. It may be worth putting out hotels with bigger holes for leaf cutters, later in the year.

Nesting mason bee

Female mason

Male mason

Female leafcutter

Leafcutter in flight

Other visitors, observed at least investigating or resting in the hotels, although may not have decided to nest there. Yellow-faced bees (Hyleaus) were spotted in some smaller holes; these bees use a silk-like spit to line their nests, so it can be tricky to see if they do not use the whole tube. *Ectemnius* solitary wasps were also seen. These predatory wasps tend to nest in rotting wood, but they have been known to use bee hotels both for nesting and 'roosting' overnight.

Yellow-faced bee

Ectemnius, roosting at night

Ectemnius, investigating

Predators and Parasitoids. Bee hotels also attract things that want to eat the bees, larvae or pollen. This is natural predation, but is also a reason that it is best not to make massive single bee hotels, since all those resources unusually close together attract hungry attention. These predators are **also** important parts of the ecosystem, pollinating and often preying on things that are *not* bees as well.

Kleptoparasites like the Clubhorned wasps and the Houdini Fly (*Cacoxenus indagator*) lay their eggs in solitary bees nests so their larvae can eat the stored pollen, while parasitoids like jewel wasps and ichneumonid wasps target the bee larvae itself.

Club-horned wasp (Sapygidae)

Ichneumonid wasp, investigating leaf cutters

Jewel wasp (Chrysididae)

Fly casing; maybe 'Houndini fly'

Broken-open cells with robbed pollen

Lessons learned

To keep the hotel design as simple as possible, the Air Bee 'n Bee protocol used drilled wooden blocks, and went with 'tilt the hotel forward' to try and prevent rain from getting into the tubes. After the very wet year we have had, this was not really adequate, with participants reporting that the mud caps in particular suffered from washout. Solitary bees tend to leave the front cell (or two) in a nest empty to reduce predator attention, so we did not see much e.g. pollen loss, but it's not ideal.

Rain damage to mud-capped tubes

Participants also reported that once-smooth holes sometimes became rough and ragged over time. Damp and expansion of wood *can* do this, but the very ragged edges of these tubes suggest that they were being pecked at by small birds (although no woodpecker damage was reported this year), particularly when previously capped tubes had been cleared out as well.

Ragged holes showing signs of pecking damage

Mud-capped tubes broken open and robbed

Next steps

The bee hotels for 2024 need to have **a roof** so that rain can be more effectively deflected. For small bird damage, the design may need to leave larger borders between the holes and the edges of the wood, to make it harder for birds to perch and peck. The smaller diameter holes being chosen preferentially is interesting, since we know that many solitary wasps also like much smaller diameters. Having two versions of the bee hotel, one with small holes (<8mm) and one with larger holes (>8mm) would be an interesting comparison. Another possibility is putting the same hotel design in different types of garden, or different parts of the same space.

Hoverfly lagoons

Creating homes for overlooked pollinators, using a container of water and decomposing plant material to mimic natural 'rot hole' habitats, and recording the number / abundance of species found in different lagoon types.

Hoverflies ovipositing eggs in Hoverfly Lagoons stretched later this year;, with the tiny first instars freshly hatched from eggs turning up in Lagoons as late as October. This could be a result of the warmer Autumn weather. There were no new species found using Lagoons this year, but plenty of activity from the species we have found before.

'Batman' hoverfly feeding on ivy flowers

The Insect ID quiz

Learning how to ID insects with more confidence, and learning new fun insect facts along the way.

While most Buzz Club projects do not ask that participants have expert-level ID skills, it is often important that volunteers can identify certain types of insects as part of a protocol. Some insect groups are easier to identify than others (even for the Team) and we want to make sure that our projects are as widely accessible as possible. We are thus exploring if the provision of project-tailored training can improve both participants' ID accuracy, and their enjoyment of taking part.

This new Insect ID Quiz project was developed by Issy (Project Lead), using two 10 minute quizzes and a focused training webinar. The insects for identification were chosen based on the UK Pollinator Monitoring Scheme type categories: bumblebees, honey bees, solitary bees, wasps, hoverflies, other flies, beetles, moths, butterflies and other insects. Each type of insect was presented in a random order in the quizzes, and participants were randomly allocated to either group A or B. One group were the **control** group, meaning they completed the training **after** both quizzes (so the training could not affect their results). The other group did their training **in between** the two quizzes, to see what effect it had.

This was our most popular project this year, with **128** participants completing the quizzes and training. Issy is currently analysing this data for publication — so far, solitary bees seem to be the trickiest to identify accurately, and butterflies are the easiest.

Solitary bees: Tricky?

Much easier!

This year's project is closed for contributing data, but you can still have a go at it for fun! The training webinar is on the Buzz Club website here: https://www.thebuzzclub.uk/events and the quizzes and supporting flashcards are here: https://www.thebuzzclub.uk/resources.

A **new round** of this project will run in **2024** with different insects — register to join here: https://forms.gle/cFXcvCBRYJzN92Z47

If the above hasn't convinced you, here are a few reviews we received this year:

"It was interesting to have a break down of the different characteristics of each type of insect. I'd never through about it before."

"[I enjoyed] just about everything! The anticipation of the quizzes arriving and the delay in finding out the results. The training was very informative highlighting subtle differences between groups of insects; it was delivered at a good pace" – *Ross Lillywhite*.

"The webinar was delivered in a friendly, informative and enjoyable way. The improvement in my quiz score clearly demonstrated the efficacy of the webinar. I hadn't appreciated the subtle difference in species."

Marvelous Miners

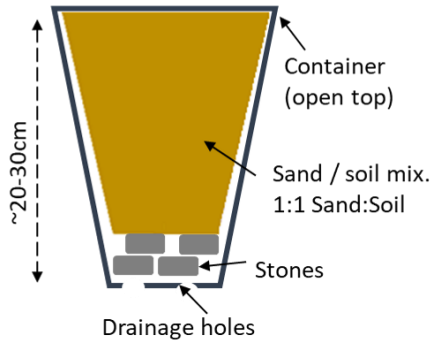
*How **not** to make a bee hotel.*

Despite our familiarity with eusocial bees (bumblebees and honeybees) most species of bee are actually **solitary bees**, where a single female bee constructs and provisions her own small nest. Such bees often nest near each other, but as neighbours rather than working collectively. They are very important pollinators and it is increasingly common to see 'bee hotels' included in wildlife gardening plans, providing extra nesting habitat for these bees. However, while the 'classic' styles of bee hotel (e.g. holes in bricks / wood; bundles of bamboo or cardboard tubes) are good for **cavity nesting** bees, they do not cover the need of all solitary bees.

The majority of UK solitary bees are actually **mining bees**, which nest in in the soil, but a lot less is known about them. 'Marvellous Miners' was the Buzz Club's first project focusing on these bees. We wanted to explore how gardeners might create mining habitat, along the same lines as more typical 'bee hotels' - e.g. small, portable, usable in gardens without much open ground, or where making a big bee bank of bare soil would not be possible.

The proposed hotel had three variations: a bucket of sandy soil (local soil + sand); a bucket-sized hole in the ground filled with the same sand:soil mix; and a 'control' area which was just cleared of vegetation. Buzz Club members joined the new project and we had 50+ hotels ready for guests in summer 2023.

Plan



Project

Result…?

The bees... hated them.

Okay, that might be a bit strong—a few hotels did seem to have a bit of interest; a little excavation here and there, but none of this initial attraction lasted. The hotels *were* pretty popular with ants, snails and woodlice, but for mining bees it was one-star reviews across the board. So did the project fail?

Not at all! The experiment did exactly what we wanted it to — investigating if these designs worked *or not*—so we know not to recommend it. There is plenty left to investigate, since participant feedback confirmed that mining bees were indeed spotted *foraging* in their gardens. Do the types of bee found in gardens actually like bare, sandy ground—or are they more likely to use e.g. low vegetation like lawns or borders? Do mining bees seek out completely new places to nest each year, or do they actually tend to stick near existing neighbourhoods? Is it better to focus on providing resources for these bees, and let them sort out accommodation on their own terms?

The retrospective webinar for this project is up on the website (link) and goes into a lot more detail about what we did, why the design may not have worked, and where we are thinking of taking this work next. We're always happy to hear your (marvellous) suggestions too!

Earwi'GO

Designing garden shelters for earwigs, to monitor populations and develop opportunities for boosting biocontrol .

Earwi'GO is an ongoing project in which we are investigating how to make 'earwig hotels', based on traditional earwig traps of: plant pot + filling. In the first year the project identified cardboard as being a preferred filling for earwigs to rest in, and unfortunately the next two years have not been very successful in terms of actually enticing in earwigs.

The projects *have* shown that the current design seems to work well in years with calm weather, but in both really hot weather (2022) and particularly damp weather (2023), participants in the project have highlighted problems with using it in real garden environments.

Last year the pots got too hot, resulting in very low occupancy of *any* invertebrates. This year, it was the turn of dampness. Plastic plant pots were not sufficiently waterproof (due to base holes), and once the cardboard was wet it did not get a chance to dry out. Slugs and woodlice thought it was excellent—but earwigs were much more likely to be found in e.g. nearby bird boxes, sweetcorn husks and rattan lamps.

We will be having a redesign for next year; this clearly *does* work, it just needs to have better weather-proofing included!

Slugs booked out most of-Linda's hotels this year.

Cinnabar moth caterpillar: planning to hibernate in a wet card hotel?

Garden Shop calculator

Recording domestic produce harvests, and showing the importance of insect-friendly gardening.

Different crop plants have different needs for insect pollination, with e.g. apples almost completely reliant on insect pollination; tomato yields boosted by about a third by bee efforts; and lettuce leaves not needing any help at all. The Garden Shop calculator is a simple way for gardeners to get a better idea of how much their horticultural success relies on help from local insects— and why investing in some more insect-friendly practices is so important!

Participants in this project record their garden yields over the year, and put the results (weight / count) into the calculator spreadsheet. This then calculates:

- How much it would have cost to by that produce in a supermarket*
- What proportion of that harvest is **directly** as a result of insect pollination
- Therefore: How much your local insects have 'earned' for you this year.

This year, Buzz Club gardeners recorded **£5914** of organic produce, with **£3432** of that relying directly on insect pollination (58%). This is a few points drop from last year's 62%, but feedback suggests it was a much worse year for some of insect-pollination heavy hitters like apples (compared to last year's bumper crops). The reliance on insects varying around 60% seems to be pretty consistent—so befriend those bees for greener fingers!

**Data based on prices from Waitrose / Waitrose Organic in July 2023; for full details and sources see the project webpage.*

Bees & Heatwaves

With high temperatures becoming more common, we are investigating how bumblebees deal with extreme heat.

With the increasing frequency and intensity of heatwaves, it is crucial to understand how bumblebees cope in the challenging conditions. Their thick furry coats make them generally more northerly distributed, and many species can even vary the flow of blood within their bodies to help regulate temperature, but thermal regulation does not have to be entirely down to physical adaptations. Bumblebees are known to change their foraging behaviours in response to temperature and day length, staying cool in the middle of the day and being more active on summer mornings and evenings.

In this project, we wanted to investigate whether bees can adapt their foraging times throughout a heatwave and if there are particular flowers that support them best during these periods. Yanet Sepulveda led this project as part of her PhD research, alongside our Research Assistant Issy. We asked our volunteers to survey bees three times a day, for three days during three periods – before, during and after a heatwave.

Unfortunately, we did not have the expected heatwaves this year, but we did have periods of weather that reached into the high 20s – temperatures which are suspected to alter bees behaviour — and so the project could continue.

In total, along with our volunteers, we surveyed **1413 bees**. Yanet is currently analysing the data for publication. The overall aim is to create a guide as to what plants best support bumblebees through a heatwave!

We are excited to run this project again in 2024 – register your interest to join here: https://forms.gle/cFXcvCBRYJzN92Z47

Enjoying a cooling sip from a dahlia. photo: C. Wyatt 2023

Ladybird Local

Creating cosy overwintering spaces for ladybirds, and learning more about their behaviour in residence.

We are comparing the effectiveness of two ladybird hotel designs:

1) The Leaning Local (based on a Natural History Museum design).

2) The Layered Local (which mimics commercial ladybird hotels).

'Leaning Local'

'Layered Local'

So far we have 42 locals set up across the UK and sampling is happening monthly—we look forward to sharing the results of these in the Spring!

Snapshots

Buzz Club projects have tended to be quite long-running, since many focus on making something or changing a method / technique, and seeing what effect this has on target insect species — with data recording done weekly or monthly across the growing season. This can take quite a while, especially if you are thinking of doing more than one project, and we have had requests to develop shorter-term projects, so that members who don't have that sort of time commitment available can still take part.

So this year we introduced Buzz Club **'Snapshots'**! These are shorter projects that focus on an insect / action that is found / done in a narrow window of time. We piloted **three** Snapshots this year, and since feedback has been positive we plan to continue developing them.

As a work-in-progress we **really want** feedback on the projects, and the Snapshot concept overall.

The Cinnabar Snapshot

Cinnabar moths (*Tyria jacobaeae*) are a striking black and red day-flying moth, and their caterpillars feed exclusively on ragwort. They only produce one generation per year, overwintering as pupae, and the adults do not tend to fly very far from where they hatch. Thus it can take a while for a population to spread into new areas, or recover from losses.

Cinnabar caterpillars on ragwort buds. They can become cannibalistic when large if they run out of ragwort to eat!

In our first Snapshot, participants recorded the number of caterpillars found on ten ragwort plants local to them; finding **1594** caterpillars on **791** plants. Populations varied a lot between sites, with around a third of participants finding no caterpillars at all on their local ragwort; more than half finding less than ten— and one garden site recording a whopping **316** caterpillars!

The more years we can do this project, the more we will be able track cinnabar populations and see what effects our wildlife-gardening actions are having on them. In particular, repeats of Snapshots at the same site in multiple years gives really valuable data about what is happening on a local scale.

Adult cinnabar moths are very distinctive, but poor fliers.

References:

Harris, P., Wilkinson, A.T.S., Thompson, L.S. and Neary, M., 1978, August. Interaction between the cinnabar moth, Tyria jacobaeae L.(Lep.: Arctiidae) and ragwort, Senecio jacobaea L.(Compositae) in Canada. In *Proceedings of the IV international symposium on biological control of weeds* (Vol. 30, pp. 174-180). http://bugwoodcloud.org/ibiocontrol/proceedings/pdf/4_174-180.pdf

Rudd, Nathan T., and Peter B. McEvoy. "Local Dispersal by the Cinnabar Moth Tyria Jacobaeae." *Ecological Applications* 6, no. 1 (1996): 285–97. https://

The Ladybird Snapshot

Ladybirds are a hugely important part of our native wildlife, helping control populations of many different species and providing food for birds and other invertebrates. They are also generally easier to identify in the field than many other insect groups. Our second Snapshot was a 10-min survey for ladybirds on local patches of plants: one in the garden, and one in a nearby wild(er) place.

The Snapshot found **119** ladybirds, from **six** species. The most common species found were **7-spot** ladybirds (*Coccinella septempunctata*) and the Harlequin ladybird (*Harmonia axyridis*). Examples below:

7-spot

Kidney spot[1]

Pine[2] */ 2-spot*[3]

16-spot[4]

Harlequins (highly variable colours)

Photo credits: 1) S. Garvey, 2) I. Baird, 3) C. Wyatt, 4) I. Baird; otherwise L. Birkin.

Comparing the two types of site (Garden and Other), ladybirds were equally likely to be **present** on both, but Gardens contained a greater **abundance** of ladybirds (meaning more individuals), and more species were found there (5 species in Gardens, 3 in Other); shown in Figure 1. Interestingly, the non-native Harlequins were found on **more sites** than the native 7-spots were. 7-spots were more **abundant** on sites where they *were* found, and more likely to be found in **garden** patches*; shown in Figure 2.

Since Harlequins are considered an invasive species and are known to be having negative impacts on UK native ladybirds (especially 2-spots), it is positive to see them at least not being the absolutely dominant species of ladybird spotted! 7-spots are our largest native ladybird and more able to directly compete with Harlequins, so it would be interesting if the 7-spots are able to hold their own in gardens spaces.

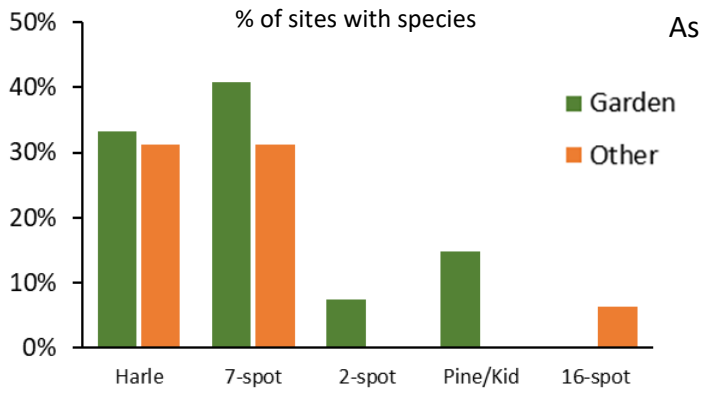


Figure 1: Proportion of sites where different ladybird species were found in the 2023 Snapshot.

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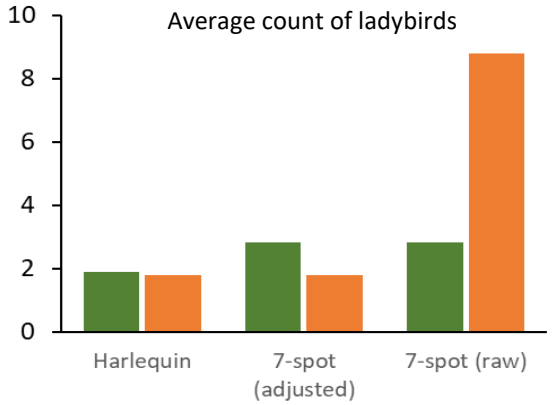

Figure 2: Average number of the most common ladybird species on Garden or Other sites.

* **Note**: One specific Other site had an unusually high number of 7-spots, and we have decided to treat that as an outlier for now (hence the '7-spot adjusted' graph) since it is so different to the other results. As with the Cinnabar Snapshot, repeating the project and getting a larger dataset would allow us to better identify if results are unusual or part of a wider pattern.

The Ivy Bee Snapshot

Our third Snapshot focused on the UK's newest bee—the ivy bee (*Colletes hederae*). First recorded in 1993, ivy bees time their emergence with the start of ivy flowering. Their UK distribution is spreading rapidly, but they are not considered to be an invasive species as they do not seem to be having any negative effects on already-established wildlife.

An ivy bee, laden with pollen.

Ivy bees are a species of 'plasterer bee', which use cellophane-like spit to line and waterproof the cells of their burrow nests. They are solitary bees, but females do like to nest *near* each other, often in very large nesting aggregations. These are extremely busy at the start of their flight time (from early September) as the males hatch first and compete vigorously for access to females!

Our third snapshot focused on these charismatic bees, asking participants to go and check their local mature ivy to see if the bees were present and to record their behaviour. We were also hoping to identify nesting aggregations, and feed that data back into the Bees Wasps and Ants Recording Scheme (BWARS) monitoring scheme for ivy bees.

*Mature ivy (10+ years) produces round inflorescences of yellow flowers, and is a **massively** important source of pollen and nectar in late summer / autumn. The top right image zooms in on a pile of shed pollen—this abundance of resources is what ivy bees specialise on.*

While this Snapshot was interesting to set up, it was not very successful in finding ivy bees! Two large aggregations were found— one with 700+ bees on the Sussex University campus, and another impressive 1200+ bees near Worcester. However, there were not many records of ivy bees in general over the Snapshot time.

It is likely that we mis-timed this project. Cold wet weather may have delayed the bees' emergence (Linda found some weeks later, on a site where they had been recorded earlier in 2022) so we may have to rethink if this species is suitable for a single short Snapshot project.

For more information about ivy bees, check out the BRC's recent EntoLIVE webinar: https://www.youtube.com/watch?v=8C6tkfiePpE

A rather chaotic mating ball of ivy bees! Males emerge first and fight for females above nesting aggregations. Photo: J. Young 2023.

(Paper) To Flea or Not To Flea?

With 52% of UK adults owning a pet, the use of prophylactic flea treatments is common. However, the wider ecological effects of these treatments are not well understood.

There are an estimated 10.2 million dogs and 11.1 million cats sharing our households across UK. Pet owners provide shelter, food, enrichment and care for their pets, and veterinary interventions are common for companion animals—ranging from simple health checks to complex treatment regimes. As with human medicine, prevention is often considered better than cure, and with the 1990's invention of potent, supposedly safe treatments for ectoparasites, frequent prophylactic 'flea treatments' have become a typical part of pet healthcare.

However the wider environmental consequences of these treatments is not well understood. Many flea treatments are topically applied ('spot-on' methods), but other methods include tablets, collars and injections, providing multiple possible routes for the active ingredients to be lost into the wider environment (e.g. through shedding, washing, excretion, and so on). The potential impacts on waterways and non-target invertebrates is of particular concern, since two of the most common antiparasitics used—fipronil and imidacloprid—have been restricted in the UK for agricultural use *because* of these impacts.

Following on from their earlier research, which found fipronil in 100% of English rivers and imidacloprid in 70% of them , this recent study by veterinary surgeon Rosemary Perkins and Professor Dave Goulson considered the risk of topically-applied flea treatments reaching waterways. They looked at the potential scale of the problem; investigating how much flea treatment is used in the UK, and the frequency of activities that may lead to transfer of active ingredients into waterways. They used a multiple-choice online survey of 1,009 UK pet owners (603 dogs and 406 cats), to find out what sort of flea treatments owners used, and what they did / allowed their pets to do relating to water.

The majority (86—91%) of pet owners surveyed had used some form of flea treatment in the last year, with the most of *those* (84%) indicating that they were aware of– and followed– the product guidance regarding pets' swimming and bathing. Treated dogs were bathed or allowed to swim less frequently than untreated dogs, suggesting owners are generally aware of and willing to follow this guidance. The frequency that owners washed pets' bedding (potentially introducing shed flea treatment into waterways via drains) was not affected by whether or not flea treatment was used; suggesting a route of transfer where there is currently little guidance provided to owners. This may be a particular issue for cats—since they are much less likely to swim or be bathed, but were also shown to have a much wider range of sleeping places in a house, making this 'down the drain' pathway more difficult to restrict.

The paper also reviews the current guidance on usage of flea treatments and the growing awareness within environmental and veterinary communities of these concerns. The British Veterinary Association has recently (2021) recommended against 'blanket' prophylactic flea treatments, instead suggesting more risk-based approaches worked out between owners and vets. In order to make better evidence-based decisions and policies about flea treatments, improved understanding is urgently needed. This study highlights the potential scale of the problem and explores some of the pathways that may contribute to it, but strongly emphasises the need for more research into the whole area, so we can ensure the best outcomes for our pets *and* our wildlife.

This paper is open-access and can be read in full here: Perkins R, Goulson D. 2023. To flea or not to flea: survey of UK companion animal ectoparasiticide usage and activities affecting pathways to the environ-

(Paper) Crop–pollinator interactions in urban and peri-urban farms in the United Kingdom

Hoverflies and bumblebees visit the widest variety of urban crops, but strawberries could use more help.

Elizabeth Nicholls, Janine Griffiths-Lee, Parthiba Basu, Soumik Chatterjee, Dave Goulson

Growing food in and around cities could be a partial solution to sustainably increasing food production in an ever-more urbanised world. Recent studies have shown that small-scale urban farms can be as productive, if not more so, than large-scale conventional farms. Many of the crops commonly grown in these environments rely on insect pollination, but urban pollinator populations are under-studied.

Beth examining some broad beans: @Bethbees

Nichols *et al.* continued their research into urban plant-pollinator networks, based in the city of Brighton and Hove, UK. Over two years, this study quantified plant–pollinator visitations to allotment crops, examining insect-pollinated crops are grown and the diversity of insects that visit those plants. They also conducted pollinator deficit experiments to determine whether there are sufficient pollinators in urban allotments to adequately pollinate two commonly grown insect-pollinated crops, strawberries (*Fragaria x ananassa*) and runner beans (*Phaseolus coccineus*).

A broad range of insect-pollinated fruit and vegetable crops were grown in allotments and were visited by a diversity of insects spanning many taxonomic groups. The study found little evidence that runner bean crop yields were limited by a lack of pollination; however, open-pollinated strawberry plants produced more 'unmarketable' fruit than those that received supplemental hand pollination – suggesting there is potential for improving the delivery of pollination to strawberries grown in urban areas.

The results suggest there are potential opportunities for expanding urban food production to the benefit of both people and biodiversity. Dr Beth Nichols summarised:

"We know that allotments are visited by many different insects and this diversity helps to support the production of fruit and vegetables. Our research shows that urban crop pollination could be improved through the provision of food and nesting habitats for insects, such as hoverfly lagoons."

Strawberry pollination may be limited on allotments; @Bethbees 2023

The full paper is open-access here:
https://nph.onlinelibrary.wiley.com/doi/full/10.1002/ppp3.10376

(Paper) Sow Wild! Effective Methods and Identification Bias in Pollinator-Focused Experimental Citizen Science

A combination of different sampling methods and expert validation improves the value of citsci data.

Janine Griffiths-Lee, Elizabeth Nicholls, Dave Goulson

A Sow Wild! mini-meadow and pan traps

In the latest paper from the Sow Wild! Project—which investigated the benefits of sowing a mini-meadow in private green spaces—Dr Janine Griffiths-Lee led an investigation into how to get the most value out of the data collected by participants. A common debate about the use of citizen science is around how accurate the data can be, given that the collectors are non-specialist and the taxa involved can be tricky to identify. Sow Wild! was in a great position to examine this because the project used several methods of data collection, with samples from pan traps and yellow sticky traps) identified by participants *and* subsequently verified by researchers; alongside participant-only observational insect watches. Comparing the accuracy of identification in these different methods allowed investigation of potential bias in identification skills and sampling methods conducted by citizen scientists.

The insect watches produced the *most* insect records overall, but were more subject to errors and uncertainty on the part of the observers—insects are small and fast, after all, and identification in the field is not always simple. Observation-only datasets also tended to focus on larger, more conspicuous or more well-known insects (such as bumblebees); this was true for both volunteer participants *and* researchers, since much smaller / more cryptic insects are easier to miss.

Honeybees and bumblebees were easier to ID

Bumblebees and honeybees caught in pan traps were also identified with similar accuracy between researchers and citizen scientists. Solitary bees proved tricker, being more likely to be misidentified as social wasps or hoverflies by volunteers; and the sheer number of small flies potentially sampled by these methods was reported as a daunting identification task.

Solitary bees were trickier

The key results from the Sow Wild! project overall differed between specimen-based and observation-only data sets, such that incorrect conclusions may have been drawn if it had relied solely on observations. Providing training to participants—particularly if less conspicuous insect groups are being targeted—improves accuracy in observations and sampling identification. Pan trapping is a trickier method to incorporate into citizen science projects than pure observations are, since trapping requires more materials, handling, and is a lethal sampling method, but the improved value of having physically sampled datasets which can verified by experts may outweigh those concerns.

The full paper is open-access here:https://theoryandpractice.citizenscienceassociation.org/articles/10.5334/cstp.550

Where next?

*We're already planning for next year—and we want to hear from **you** even more!*

We've had a really interesting year in 2023, trying out all sorts of new things. Some have worked, some haven't been so Marvellous, but it's all given us a much better idea of how we want the Buzz Club to develop. Our brilliant members and sponsors are what keeps the whole thing running, so we are setting up some new ways for **you** to have a say in what we do.

RECRUITING: Members' Working Group.

We are looking for members who want to help steer how the Buzz Club interacts with and supports our volunteers. This will be an online group, focused around quarterly Zoom meetings, and if it's something you would like to be involved with let us know by emailing buzzclub.uk@gmail.com. We also plan to hold our first Buzz Club AGM next year, so there will be plenty of chances to have input and chat with us if a full working group isn't for you!

NEW: Local Facilitators

Do you run a community group in your area? We would like to put together a group of local facilitators to promote and deliver projects to their local groups. This will include receiving a training webinar on how to deliver the projects, and Project Packs to help this happen. If you run a community group and this appeals, please contact us at buzzclub.uk@gmail.com.

Linda running an outdoor session

NEW: Calling all schools!

Very soon, the Buzz Club will be offering school sessions for all ages, aimed to get kids and young people involved in citizen science, whilst hitting those all important national curriculum targets.

If you are in Nottingham or Sussex, keep an eye out on our website for updates. If you're not in these areas, do not worry — we will be offering online webinars for schools/groups anywhere in the UK.

Thanks again, from the Buzz Club Team!

We're always on the look out for new project ideas, new questions to think about, and new problems to get stuck into, so give us a **Buzz** if you have any ideas!

buzzclub.uk@gmail.com @the_buzz_club TheBuzzClubUK the_buzz_club