The London Beekeepers' Association
LBKA News

March, 2016

In this bumper issue, Geoff is back, on how to make our own crown boards (page 19). Vesko is also back, writing about pollen on page 17. Emily's blog entry last month prompted Paul Hurd to ask Francis Ratnieks from LASI to give advice using of oxalic acid against varroa (page 22). Emily and Emma have written up our winter lecture (page 29) and meadery trip (page 13). Rebecca & Vlad write up our microscopy course, Ted and Sue continue their columns (pages 15 and 16), Eugene tackles the Facebook digest (page 27) and regular features from Richard, Howard and Mark.

A big thank you to all this month's contributors: **Eugene Fahy, Richard Glassborow, Geoff Hood, Paul Hurd, Sue Lee, Howard Nichols, Ted Parkes, Mark Patterson, Francis Ratnieks, Emily Scott, Vesko Starchikov, Rebeca Teare, Paul Vagg and Vlad Zamfir**. We're always looking for new and interesting contributions – please contact me.

Aidan Slingsby
services@lbka.org.uk

From our Chair

Richard Glassborow
chair@lbka.org.uk

If I'm honest I think the news from the Charity Commission that LBKA is a charity (page 4) took us all a bit by surprise. We had all been expecting there to be some further questions, re-drafting, haggling or something. The fact that our application has just gone straight through, first time, is without question a great credit to the energy, skill and thoroughness of Tristram Sutton who has been responsible for the whole process. Tristram, our thanks: take a bow.

And within a matter of days of this news being circulated one of our on-the-ball members contacted us to point out that the Association is now eligible to apply for grant funding from his company. I can't say any more just now but it is an indication that our change in status will open opportunities previously unavailable to us and hopefully help us become more effective in our objectives for members and bees. Meanwhile, it is now March. So, what happened to the weather? It

A large flowering crocus, bearing pollen. Photo: Mark Patterson.

The venue for March's monthly meeting – the white door on the left.

seems colder now than it has been all winter. I have been caught like this before: I'm cold, it's miserable, therefore the bees will not be doing much – it's too cold for a first inspection – I don't have to do anything yet except check they have enough to eat. Wrong! Day length is really drawing out now and bees have plenty of time between the showers to just get on with what they do. By the time it is warm enough for a first inspection things may, or may not, be quite advanced.

This brings two imminent issues to mind, varroa management and swarm control. A cool spring is unlikely to result in early swarming but it does affect our strategies in connection with varroa management. Up until Christmas the winter was exceptionally mild. My varroa monitoring indicates that the oxalic acid treatment in these conditions may not have been as effective as it can be, perhaps because the bees were not clustered when I applied it. The drop I am seeing in some colonies is too high already. That in itself would not normally concern me too much as I set great store in managing varroa at this time of year with a shook swarm with a varroa trap frame. But mild weather and a good nectar flow is required if colonies are to recover quickly from a shook swarm. In current weather conditions they may not recover at all, should one be foolish enough to try. A late shook swarm means the colony may not have grown sufficiently to take advantage of the all important Horse Chestnut nectar flow, usually in May, and/or could delay a colony's natural swarming tendency so that you have small split colonies when the Lime trees flower in early summer.

Of course, in past years, it has suddenly turned warm, even hot, in March. But we only know that with hindsight. The current Met Office long term weather forecast is not certain but indicates we might still be experiencing below average temperature and or unsettled, wet weather right into mid April – http://www.metoffice.gov.uk/public/weather/long-range-forecast/.

But there are two certainties – we have to be prepared for anything (as in have equipment ready) and a high varroa infestation at this time of year has to be treated or we loose, not just honey, but our bees. So there is really no dilemma, just something to fret about as usual with beekeeping!

Announcements

This is our official place for announcements. If you only read one section of the newsletter, it should this one!

Next Monthly Meeting

The next monthly meeting will be on **Sunday 13th March** at **Fairley House Junior School**, 220 Lambeth Rd (SE1 7JY) at **11:00-13:00** on the subject of **swarm management**. This meeting is one of our most important topics as urban beekeepers. As colonies gear up for the new season, we'll be trying to keep one step ahead. This and other related topics will be followed by the usual hot drinks, cake and chat. Meetings are for members only, but you're welcome to come as guest to find out more about our association.

April's meeting will be a hands-on microscopy session where we'll be looking for signs of nosema in colonies. You'll be able to bring a sample of your own bees to test.

Thank you to Paul

Paul Vagg recently decided to step down from the committee (see page 6).

We would like to express our gratitude to all Paul has contributed to the association over the last year and a half. He fulfilled the important role of looking after LBKA equipment and managing its swarm apiary. Not only did he **keep track of, repair and clean association equipment**, **hire out equipment** to members, was there to **receive swarms**, and turned those **swarms into nucs** for our apiaries and members... he also allowed LBKA **use of his lock-up and yard** for these purposes. He has left the equipment in a good state of repair and we now have a comprehensive inventory of our assets.

If anyone can help with (even a small part of) what Paul did, including providing space for our swarm apiary and storage, please contact me on services@lbka.org.uk.

Winter lecture

Thanks to those that turned out to our Winter Lecture. Norman Carreck from the International Bee Research Association was an excellent speaker and talked about colony losses, native bees, pollen diversity and the small hive beetle. See Emily's writeup on page 29.

Forage suggestions

Thank you for everyone's forage planting suggestions that we asked for last month. We will discuss these at

next committee meeting and will start to form a plan to take these suggestions forward.

Can you be a mentor?

Our weekend beekeeping courses are now sold out, so Tristram is starting the mammoth task of organising our **mentoring programme** with these 60 new potential beekeepers. This is quite a task, for which we need help from our members in all part of London.

If you are an experienced beekeeper and would like to pass on your knowledge and enthusiasm to a new beekeeper please consider joining the LBKA Mentoring Program as a mentor. Being a mentor involves inviting one or more new beekeepers to join your weekly inspections throughout the active season. This started after our second weekend course in May.

Even if you don't feel that you're very experienced, if you've kept bees for more than two years, have the BBKA Basic qualification, and enjoy passing on beekeeping knowledge, it is very **likely you'll be a good mentor**. Please contact Tristram on mentoring@lbka.org.uk if you'd like to discuss.

Mentees have found the practical experience invaluable. Mentors get a lot of satisfaction from the teaching and many mentees soon become willing and able assistants in your apiary which can be a great help at busy times of the year.

If you are interested in learning more about the LBKA Mentoring Program please contact Tristram Sutton on mentoring@lbka.org.uk.

Apiary sites on offer

BBKA have been talking to the London Fire Brigade about offering sites to beekeepers. Potential sites are Wennington (RM13 9EE), Hornchurch (RM11 1SH), Woodford (IG8 0BS), Park Royal (NW10 7NU), Chiswick (W4 4JY), Biggin Hill (TN16 3UB) and Addington (CR0 0QA). If you're a BBKA member, have BBKA Basic and are interested in any of these sites, please contact services@lbka.org.uk for more details. The sites have not been risk assessed yet, so it would be your responsibility to do this. Ask if you need any help.

LBKA looking for a new swarm apiary

If you have a site that might be suitable for one of LBKA's swarm apiaries, please contact me on services@lbka.org.uk.

Political contacts?

LBKA is thinking of communicating with London mayoral candidates about bee and pollinator forage related issues. Does anyone have any useful political contacts in this regard? If so, please talk to Richard on chair@lbka.org.uk.

Neil's Yard Remedies are helping fund our forage creation programme.

£2500 donation from Neil's Yard Remedies

Neil's Yard Remedies have decided to donate a further £2500 to LBKA through their "Bee Lovely Campaign. They are allowing us to spend the money in whichever way we wish.

We will use the money for our forage creation programme which Mark is running. So expect more requests for help with planting as the year progresses!

A big thank you to Mark for both running and raising funds for our forage creation programme.

LBKA supersedure: our application to become a charity

Tristram Sutton
mentoring@lbka.org.uk

On 24 February, 2016 the Charity Commission approved our application for the LBKA to be a Charitable Incorporated Organisation (CIO) as follows:

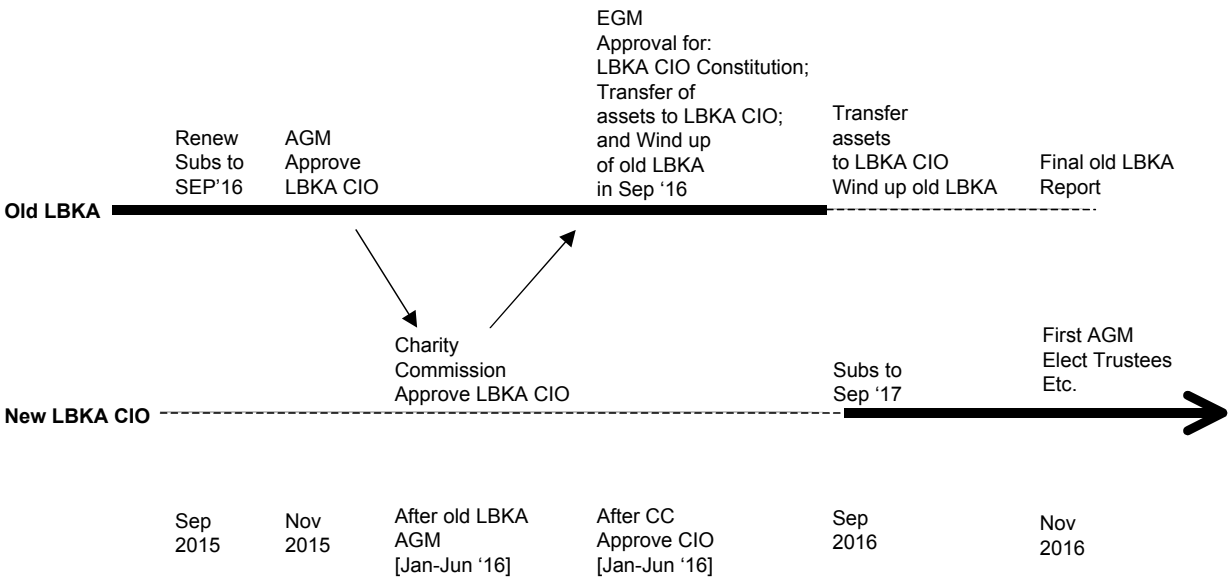
> *We are satisfied that THE LONDON BEEKEEPERS' ASSOCIATION is a charity and it has been entered onto the Register of Charities with the Registered Charity Number 1165736.*

The old LBKA will continue to operate until the end of September this year when it will be replaced by the new charity LBKA.

The next step is for us to hold an EGM to: approve the constitution of the new charity LBKA[1], and approve the transfer of old LBKA assets into the new LBKA charity. In this way, from September 2016, the new charity LBKA would be the operating entity going forward.

The plan for members is that they would be asked to "renew" their LBKA membership by subscribing for

[1] The draft constitution of the new LBKA was circulated before the last AGM and the Charity Commission approved this constitution without material amendment.



LBKA supersedure: timeline to becoming a charity. Diagram by Tristram Sutton.

membership of the new charity LBKA. This would be done towards the end of this year as usual for renewals.

The plan for the committee is that it would continue to work for the old LBKA until the end of its year as usual. The elections / re-election of committee members which takes place at our AGM would be replaced by election of trustees for the new LBKA (ie whose function would replace the function of the current committee).

As you can tell, we have tried to make the transition for the LBKA from non-charity to charity as seamless as possible and with as little change to what the LBKA does and how it does it as possible. Hopefully the benefits of becoming a charity will start to accrue soon, not just in improving our tax position but also in improving the way in which the LBKA is viewed.

I hope this brief summary is clear. However please let Tristram Sutton (mentoring@lbka.org.uk) know if you have any questions or comments.

Selecting for hygienic behaviour at LASI in 2014.

LASI Workshops

The Laboratory of Apiculture & Social Insects (LASI) is running a series of workshops this summer of interest to beekeepers. Each workshop is **£10** and is restricted to 25 people on a first-come-first-served basis. **You must book online advance**. All workshops are at LASI in Falmer (near Brighton) at 13:30-17:00.

The workshops are all built on the results of LASI research carried out as part of the Sussex Plan for Honey Bee Health & Well Being. They are taught by the LASI team including Professor Francis Ratnieks, Dr. Karin Alton, Mr. Luciano Scandian, Mr. Hasan Al Toufailia, Mr. Norman Carreck and Dr. Mihail Garbuzov.

Garden plants for bees at LASI in 2013.

Determining the Most Attractive Plants for Bees

Varroa workshop at LASI in 2014.

and other Flower Visitors on Friday 1st and Saturday 2nd July 2016. http://www.sussex.ac.uk/lasi/newsandevents/events/plantsforbees

Breeding and Using Hygienic Bees on Friday 8th and Saturday 9th of July 2016. http://www.sussex.ac.uk/lasi/newsandevents/events/hygienicbehaviourworkshop

Integrated Varroa Management on Friday 2nd, Saturday 3rd and Sunday 4th September 2016. http://www.sussex.ac.uk/lasi/newsandevents/events/ivmworkshop

Members' area on the website

All members have access to the "members-only" section of the website at http://lbka.org.uk/members_area.html. Just 'reset' your password to get access. You can check your details (and BBKA membership number), read minutes of committee meetings and a few other things.

For those that opted to share your details with other members, this is where those details are shared.

Old announcements from February

Check previous newsletters at http://lbka.org.uk/newsletters.html or contact services@lbka.org.uk for more details.

Swarm list. Please contact Emma on admin@lbka.org.uk to be added to BBKA's swarm list.

'The Hive' at Kew is an aluminium installation that will draw visitors into the space via a wildflower meadow, as though they are worker bees returning to the hive; http://www.wolfgangbuttress.com/.

Bee Improvement For All Epping Forest Beekeepers have invited us to attend a this one-day event on **13th March** at 09:30-16:30 at **Copped Hall, Epping, CM16 5HS**. Tickets are £10/£5 under 16 and may be booked from secretary@eppingforestbeekeepers.co.uk.

BBWear: have a 20% discount for members on clothing and a 50% discount on some of their gloves. To take advantage of this, ask Aidan (services@lbka.org.uk) to confirm with them that you're a member and then order by phone. The discount is only available for phone orders.

Honey wanted Member Joe Fox is looking for honey to buy for use in a restaurant. Contact him on joe@petershamnurseries.com.

Old announcements from January

Forage ideas? Contact Mark at forage@lbka.org.uk with your ideas on places we could do forage planting events.

Do you have any announcements?

If you've any announcements for the next issue of LBKA News, please send them to Aidan at services@lbka.org.uk.

Paul Vagg's Resignation

Paul Vagg
LBKA member

For the last year and a half, I have been greatly honoured with the task of looking after the LBKA nucs and swarms apiary, along with my committee role as resources officer, maintaining and storing all the LBKA equipment. I have thoroughly enjoyed both roles, and it has been an amazing learning curve, challenging and fun, although extremely demanding.

With the new season just around the corner, I have unfortunately come to the conclusion that I would be unable to fulfil my duties, and as such feel the time is right for me to step aside and let someone else take the reigns.

There are many reasons for this, and it has been a difficult decision for me to take, which I given considerable thought to before deciding upon this action.

The role of resources officer is demanding although no more than any other individual on the committee. I have been responsible for the repair and maintenance of all the LBKA equipment, painting and repairing 30 odd nuc boxes a time, painting and repairing hive parts, cleaning it all, washing and repairing all the suits etc. This is in addition to hiring out equipment for the association, keeping an equipment inventory of all LBKA sites, managing the swarms apiary and assisting when possible at events.

As those who have met me will be aware, my health is not the best and I have managed to fulfil my duties despite back and shoulder operations during the last year, in addition to many previous surgeries, but on the 4th March I have to have reconstructive surgery on my left wrist, followed by the same on my right two months later. This presents numerous problems for me as it is obvious with the lifting and management of both the equipment and the swarms apiary, in addition to my own bees, that I just simply would not be able to manage the role to the best of my ability and benefit of the members.

I am looking forward to taking my modular exams, continuing mentoring, looking after my own bees, along with establishing a new community apiary, as well as a new apiary site of my own, so there is lots to be done.

In the years to come I would love to return to the committee, although in a less physical role, perhaps assisting the wonderful Howard with education, although I'll need to be taking a few more exams to get near that level!

I wish the current committee the very best in achieving all the goals for the future, and to the members I say, "Thank you for allowing me to play a small part over the last year and a half towards that end!"

Bring on the new season!

February's monthly meeting: Spring management

What happened at last month's meeting.

Howard Nichols
education@lbka.org.uk

Attendance at the meeting was in excess of 30 – a good attendance for a cold, February morning. The subject was early Spring management, including Shook Swarm and Bailey methods of frame change. The meeting was led by Karin Courtman who led us through the subject matter. Attendees at the meeting ranged from new beekeepers who had not yet undertaken any early spring management to older, more established beekeepers who had undertaken this work many times.

Karin started by reminding that more bee colonies die out in early spring than during the winter months. A statistical fact of beekeeping but one which we should all recognise and use to remind ourselves of the importance of our work at this time of year.

Due to the unusually warm winter, lack of stores may well be an issue and feeding may be necessary. If we commence feeding then we must continue until the spring flowers and nectar flow arrive whereupon the bees become self-sufficient. Karin dealt with the 1st colony inspection of the year which is likely to be in early March when the temperature is at least 14°C. She covered some of the situations we may find, including:

1. Drone laying queen
2. No queen at all (laying workers)
3. Honey and nectar shortage
4. Pollen shortage
5. Nosema parasite
6. Colony died out
7. Old frames now needing replacing

With item 5, Karin illustrated her talk with a sample of slides showing the effects of Nosema on the combs.

With item 7, frame replacement, she explained the differences between Shook Swarm and Bailey methods. There are pros and cons for both of these. Shook Swarm also removes a lot of varroa from the colony at the same time as replacing frames. The Bailey method is a lot gentler on the bees.

As usual the meeting was interactive with many questions and further contributions from the members. We finished a little earlier than usual which meant more time for individual discussion and talking after the topic.

To any new members who have not been to our Sunday monthly meetings please do come along and give it a try. You will find a friendly atmosphere and informative and passionate discussion about many beekeeping aspects. If you have not been before please introduce yourself to a committee member so that we know you are new. The monthly meetings are all included within your membership and are free to all. Even the tea, coffee and cake are free! The topic of discussion is only one element of the meeting. It is also an informal and sociable event where members meet with each other to discuss bees and beekeeping and secure support with managing their colonies. The Committee tries its best to reflect members' wishes and aspirations on beekeeping matters. If you would like a particular beekeeping subject to be the topic for discussion at a monthly meeting please ask a committee member.

March in the Apiary

Where we should be with our colonies at this time of year.

Howard Nichols
education@lbka.org.uk

March is a time of increasing activity within the hive but it all depends upon the weather. For the beekeeper it is also a month of increasing anticipation. Assuming the weather improves then the colony at the end of March should be substantially different from the one at the beginning. The intervening days can include warm, sunny days, which encourage plants to flower early, and bees to forage. The weather can just as easily revert back to cold. The former causes the bees to produce more brood and the latter to retreat back to a cluster. This winter has been unusually mild and Mark, our Forage Officer, reported in the February newsletter that more species have been in flower early than usual and this may result in a reduced food supply in early spring.

Stores

The main job of the beekeeper is still to keep an eye on stores. Old "winter" bees are starting to die off and new bees are being born. Food reserves are decreasing but demand for food is substantially increasing. The bees will be using energy flying on warmer days but mainly bringing in pollen, not nectar. They also need to keep the brood at a higher temperature (about 35°C) which also uses more energy. Stores can quickly be depleted in March and early April.

First inspection

The first warm day from the start of March is an opportunity to have a quick look inside the hive. If so, then this will constitute the 1st inspection of the new season. The new colony card should be made up and inspection details recorded. Minimum temperature should be 10°C for a quick look but without taking out brood frames. If there is an exceptionally warm day with the temperature 14°C or more then a detailed colony inspection may be made. Otherwise, leave this until April.

Observe the entrance

If an inspection is not possible, then observing the colony entrance will provide invaluable information. If the bees are bringing in pollen, purposefully entering and leaving (flying a beeline) then these are always good signs. If the bees are aimless, listless or without purpose on a warm day then, prima facie, all may not be well.

Monitor the varroa mites

This is a good time to monitor the mite drop. Leave the inserts in for a week and count the mite drop. If > 2 mites per day then some action will be needed in Spring. If > 7 mites per day then action is immediately required. I am not confident that my Oxalic Acid treatment was as efficient as usual due to the warmer weather and lack of clustering. Therefore, varroa monitoring will form a major part of my beekeeping plan this year. The National Bee Unit produces an excellent booklet "Managing Varroa" which is available for free download. There is also comprehensive information about varroa on the NBU website, including an on line varroa count calculator at http://www.nationalbeeunit.com/.

Siting your bees

Those who were on the LBKA mentoring schemes last year and have not yet acquired bees (but will do so) should prepare the hive and site. If acquiring bees by means of the purchase of a nucleus from a supplier then the order should have been placed by now. Demand often exceeds supply.

Mentoring

Those who will not keep bees this year but want to have mentoring with a more experienced beekeeper should make suitable arrangements.

Formulate a beekeeping plan for the season

This need not be elaborate and may be such as improving swarm control, attempting a new manipulation, maximising honey production (ensuring there is the maximum number of flying bees in the colony when the honey flow starts), etc. The opportunities are endless.

Finally. . .

On a sad note, if you find your bees have died out then it is imperative to close the entrance to prevent robbing. Make a note of what you observe then remove and destroy dead bees and frames. Sterilise the hive parts. It is important to try to find out why the bees have died. Winter and early spring colony losses seem to average 20% to 30% so you are not alone. It does not always mean it's the beekeeper's fault but it is essential to analyse and learn. Examples of reasons include, but are not limited to, the varroa mite (the number 1 offender), lack of stores, damp / inadequate hive ventilation, site situated in a frost pocket, failing queen, poorly mated queen.

On a more optimistic note, the beekeeping season arrives in March. We have several eventful months ahead. I sincerely hope that all of us have a productive sea-

son and achieve whatever aims and goals we aspire to!

Focus on Forage

Mark's regular update on what is in flower that bees like.

Mark Patterson
forage@lbka.org.uk

March is officially the first month of spring for us in the UK, though in London it has felt very spring-like since New Year. As I reported last month, a great many summer flowering species have continued to flower well into January as a result of the warmest winter on record with many spring species also blooming much earlier than they normally would.

The numbers of exceptionally early flowers continued throughout February with **cowslips**, **primrose**, **hawthorn** and **dandelions** coming into flower across the city in large numbers. Early flowering species **crocus** – a plant loved by bees for their pollen – flowered very early indeed, meaning few pollinators have had a chance to gather their pollen. Their later blooming large flowered cousins however are still pushing up and these will provide pollen for our honey and bumblebees during March. Good news is that the tulips have yet to bloom and these will provide pollen for our bees in March through to April.

The widely planted and naturalised ***Anenemone blanda*** have flowered early. In January and February only a few of these delicate blooms were in flower but as we cross from February into March all of a sudden they have appeared in mass creating carpets of white, pink and blue in many of the city's parks and cemeteries. Many early emerging bees value these blooms for they produce an abundance of pollen used for brood rearing and by queens in need of a high protein diet to develop their ovaries.

Other flowers making an appearance include **bugle**, **ground ivy** and the first of the **Spanish blue bells** (*Hyacinthoides Hispanica*) whose blue-green pollen honey bees will collect. So far I've not seen any wild English Blue Bells which appear to be more or less developing along their usual time lines. Most of the **bluebells** in and around London are of the Spanish form but there are a few locations including Horsendon Hill in Ealing where these native bluebells can usually be seen from April onwards. The English bluebells differ from their Spanish cousins and the various hybrids by producing cream coloured pollen and having their individual bells always nod to one side of the flower stalk. Their old scientific name 'nutals' in latin means to 'nod'.

Tree bumblebee queen on dandelion.

A buff tailed bumblebee vacates a crocus after collecting pollen.

A honey bee collecting pollen from Anenemone blanda.

The sweet scented Sarcococca,

Willow catkins.

Spanish blue bells.

This week my **Grape Hyacinths *Muscari*** are looking at their best and attracting the first of the season's Hairy Footed Flower Bees. So far I've only seen the males darting about from flower to flower. These bees are highly territorial and males always seem to emerge first so that they can lay claim to desirable patches of rewarding flowers to which they can tempt females to mate.

Other wild bees venturing out into the spring landscape this last week or so include some of the earlier ***Andrena*** **Mining bees**, **Buff Tailed bumblebees** (both workers and queens) and **Tree bumblebee** queens.

Green alkanet a plant spotted in bloom last month is now also flowering in great quantity and hopefully will continue to do so throughout spring into early summer. This rampant plant is often referred to as a weed for its vigorous growth can out compete many other plants growing in shade but it's a fantastic bee plant providing nectar and pollen for a great variety of short tongued bumblebees and solitary species. The flowers are very similar to the blooms of forget-me-nots but the vegetation gives them away as their course leaves and tall stature make them noticeably different from the dainty forget-me-nots which their small soft leaves and short stature.

Last month I mentioned many of our spring flowering shrubs were coming into bloom – again very early. This has continued into March with **flowering currants** now putting on fantastic displays of pink and white blooms across the city's gardens and parks. **Hazel** – which last month, was dripping in catkins bearing bright yellow pollen – has now turned a shade of ocre as it pollens have been exhausted and the small insignificant female flowers have been pollinated. It has been replaced by **alder** and **willow** which also bear catkins and shed masses of pollen. Wind pollination is a very wasteful affair with the plants producing many billions of grains in the hope that only a few will reach a female flower – a far less efficient means of getting pollen from one plant to another but it has the advantage of being cheap as the individual pollen grains tend to be smaller and contain less energy. At this time of year whilst standing under an alder tree you will notice the ground may be stained yellow with the fallen pollen. Some authors will recommend alder as a good pollen plant for honey bees but after a bit of research I've learnt that the pollen grains are low in protein and quite starchy meaning they are poor brood food for honey bees. I've never seen a bee on Alder catkins so presumably if other authors have then the bees must be quite desperate and lacking a better alternative food source. I have however seen bees on many occasions visiting the catkins of Goat willow and their cultivars. Right now in my garden I have a weeping pussy willow coming into bloom and every morning the honey bees are working the catkins and returning to the hive dusted in yellow pollen. This is despite a diverse range of spring flowering plants in the garden so clearly not all wind pollinated plants are equal and willow pollen must contain a higher percent-

age of proteins and fats than Alder for they are popular with the bees.

Other shrubs in bloom right now in my garden are **sarcococca**, the one pictured here was in Mile End Park. These small evergreen shrubs produce masses of cream or white flowers with tatty looking petals and emit a very strong and fragrant odour which attracts honey bees and short tongued bumblebees. I smelt this specimen before I saw it as its strong perfume caught my attention as I cycled along the canal last week.

Last month I predicted that our **cherry laurels** would flower early and that we would see the first blooms in March. These plants flowered ahead of my prediction and began flowering in mid-February and as I write in the first week of March they are now at their peak a whole month in advance of last year's flowers. Cherry laurel is a valuable plant for many species of solitary bee as well as our honey bee and bumblebees but I have yet to see any bees on the Laurel blooms – possibly because they are preoccupied with collecting pollen from other plants and the return to cooler temperatures may mean that the Laurel blooms are not yet yielding nectar.

This brings me to my next thought. The Met office is predicting that March may be colder than January and February as cold fronts coming in off the Atlantic and an oscillating jet stream cause temperatures to plunge. This could set back many of our bees that have emerged early. One can only hope that they have been able to find sufficient forage to see them through a cold spell this month. Be prepared to feed your honey bees fondant if the weather turns nasty.

Moving forward to late March and into April we should see **hawthorn**, **cherry** and **chestnut** blooming. In East London the **hawthorn** is now in leaf alongside **blackthorn** which is blooming in profusion and just a few days ago I spotted **cherry** with buds bulging, about to burst. **Oak**, **hazel** and **sorbus** also look as though their buds are ready to burst into leaf. Here hoping we don't get any late frosts that could kill of soft new foliage (and freeze the recently laid frog spawn in my garden pond).

Jobs in the garden

Lift and divide: this time of year presents us with the last opportunity to lift and divide herbaceous perennials before they start to put on significant growth.

Herbaceous perennials: plant out herbaceous perennials grown from seed or cuttings last year. Get them in the ground now so they have time to spread out their roots ahead of the coming growing season.

Frost protection: less hardy plants may still require protection from fleece. Have fleece standing by to protect the blooms of soft fruits. My peach and nectarine buds are starting to open – will I get any fruit this year?

Mulch: mulch flower beds to suppress weeds come spring.

Wall flowers: plant out wall flower.

Sweet peas: Start sowing your sweet peas. I currently have some 6" everlasting pea sprouts on my windowsill. They will provide Barbie pink flowers come summer to feed the peas and unlike sweet peas they come back year after year.

LBKA Apiaries

News from LBKA's teaching apiaries.

Richard Glassborow
chair@lbka.org.uk

I managed to sustain my first bee sting of the season on Saturday 5th March! My fault of course: it was at the Holland Park apiary, bitterly cold and I "just" needed to change the fondant on one colony – so no need to suit up, the bees will be clustered. No they weren't. The whole operation once the roof was off took no more than ten seconds but that is plenty of time for a defensive reaction. I was lucky this time, just one sting on the hand. But I offer this as a cautionary tale – do not get complacent.

Sadly we have lost one colony at Holland Park, though it is really not a surprise. For some reason that colony never really got sorted out last summer after a series of queen replacements failed. They were still a small, not very organised colony in the autumn and it just did not work out for them.

But apart from that all other colonies at Holland Park, Eden, Brockwell and Mudchute look like they are going to come through the winter although we will have to

One of Holland Park's residents.

Every picture tells a story. . .

watch the supply levels and provide some fondant as this cold weather prolongs.

Petros Hahladakis is well ahead of the game at Brockwell because he is going to New Zeeland for three weeks and wanted to leave the apiary in no position to swarm. Unfortunately his plans for Bailey comb changes have been thwarted by this continuing cold weather ? too cold for bees to be drawing lots of new comb. Karin Courtman has very generously volunteered to manage the Brockwell apiary in Petros' absence. If anyone could act as understudy we would be very grateful as there might be a clash between bee requirements and Karin's race schedule. Please let me know, chair@lbka.org.uk.

I would like to take this opportunity to thank the mentees and volunteers who have been helping build the first round of replacement brood frames, over 200 so far, for our apiaries. There are just too many for the apiary managers alone to cope with. But it is a good opportunity for trainee and new beekeepers to practice and develop skills, especially if you are taking your Basic this year. This is what teaching apiaries are for. On the Introductory Course you get the opportunity to build one, maybe two frames. But now you get the chance to build ten or twenty? then you **know** how to do it. It also should be said that what can be a chore for one becomes fun as a group activity.

Once/if the weather warms up I plan to be carrying out shook swarms at Holland Park and Eden. Obviously regular mentees have priority to help with this but if any other members would like to see this procedure, please let me know, chair@lbka.co.uk. Obviously numbers will have to be limited but lets gauge demand first. It is most likely to happen on a Saturday but actual day will have to be weather dependant.

LBKA Microscopy

Howard and Richard ran a three-session microscopy course for members last month, looking at pollen and the anatomy of the bee. This followed last year's highly successful course.

Rebecca Teare and Vlad Zamfir
LBKA members

The recent Microscopy course run by Howard and Richard was an excellent introduction into looking at bees through a lens. We got to learn how microscopes work, how pollen staining is done and dissection techniques.

The first week was spent getting used to using a microscope. We looked at different types of pollen and how to extract it from honey using centrifuges. We pretty quickly learned that while there are some differences between the size and shape of pollen grains, a lot of them look the same to our untrained eyes. Even the microscopy books that Howard brought had pictures with a lot of nearly-identical looking pollen grains. It's now clear why doing honey analysis is quite difficult!

The second and third weeks were spent looking at the internal anatomy of the honey bee. We tried to (some of us even succeeded) to identify all the components of the internal anatomy of the bee, working up from the abdomen (where the crop is), the thorax (almost

all muscle) and head (containing the hypopharyngeal glands that produce brood food). Of course, we also looked at the wings, antennae and stinger which looks quite menacing under the microscope.

The course was truly extraordinary. To be able to really understand the internal workings of the bee will be invaluable to me when i am teaching others about how bees make honey and what a miracle of nature the bee really is! Doing the course has lead me to want to understand better the different diseases that the honey bee is susceptible to and to to be able to identify them for myself under a microscope.

Our visit to Gosnell's meadery in Peckham

Emma organised LBKA's winter trip to Gosnell's meadery and has written up what it was like.

Emma Nye
admin@lbka.org.uk

We were welcomed on site and invited to try some of the mead before the talk began. Gosnell's mead was founded by a hobbyist home brewer who began with

Tom

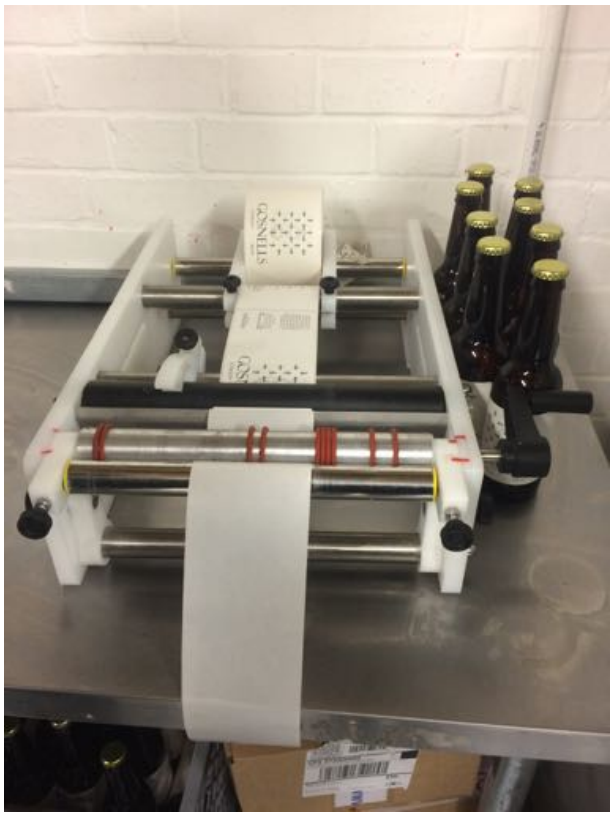
cider. During a trip to the States, owner Tom tried mead for the first time and was inspired to try and brew it. Two years on the operation in Peckham churns out 3,000 bottles a week.

The process

Tom explained the process of making his mead, which is essentially a mix of honey, water and lager yeast. He explained the key to good mead is to keep your yeast happy - so he also adds in some extra nutrients too.

We were able to try mead from the start of the fermentation process, which was much sweeter. Over the course of fermentation, the yeast feeds on the sugar, turning it into alcohol and carbon dioxide. When the alcohol content reaches 5.5% it's bottled and these are then bathed in hot water to stop the fermentation process. Because it's capped before the fermentation process is finished, the fizz is natural. The result is a light, slightly sparkling easy to drink mead, it's nowhere as sweet as you might expect. Some members later tweeted they've found their new favourite tipple.

The 3,000 bottles they produce each week, are capped and labelled on site.



The honey

Onto the topic our members were most interested in - the honey. Honey dictates the ABV and sweetness of the mead. Gosnell's uses a blended orange blossom honey from Spain. They have experimented with London honey but because the flavours vary so much due to the wide range of forage it's hard to ensure consistency of flavour in the end result. Each batch he brews is 30L (with a mix of 1:5 honey and water), so the minimum honey needed for a one off batch would be 15-25kg.

He has even created special mead in the past for a rock band who wanted to serve it at a gig!

Top tips for home brewers

- Cleanliness is essential! It was recommended that everything is sterilised with boiling water before you begin.
- Enough yeast will outcompete all other bacteria. If you've not used enough yeast the mead may go off.
- If you have ropey (but not off) mead hold on to it for a while for the flavour to develop.
- You can buy different yeasts that will create different meads - experiment with different types.

What next for the meadery?

Gosnell's is now on tap in craft pubs throughout London, and you can buy it bottled in various retailers too, so keep an eye out for it near you, their website has a section on where it can be bought and the product has been securing great national reviews. We got to see some top secret experimentation under way, as the meadery hopes to try and create some new ranges.

Here & there

Ted continues with his monthly thoughts inspired by difference in beekeeping in this country with that of his native Canada.

Ted Parkes
LBKA member

Ever since I started keeping bees back in Ontario the term "Integrated Pest Management" or IPM has been an important part of my beekeeping strategy. IPM is more then just a schedule or list of treatments. The objectives of an Integrated Pest Management Plan are as follows.

1. To control Pests.
2. To prevent pests from developing a resistance to pesticides
3. To improve the economics for the Beekeeper
4. To reduce the use of pesticides and impact on the environment.

Tracheal mites arrived in Ontario in the late 1980s and varroa in the early 1990s and at that time Formic acid was used for Tracheal mites and Apistan (fluvalinate) was the only product approved for Varroa. Apistan was an effective product for nearly 10 years before resistance became an issue. Shortly after formic acid was identified to effectively control varroa but more work was needed to make it safe to handle. Eventually lead to products like MiteAway Quick Strips and Apivar has been effective controlling varroa since 2009. There have been a few other treatments that have come and gone and are no longer available due to resistance. However there has been some development in new products to help in the fight against pest and disease. Oxalic acid, Thymol, Apivar and Formic acid based MiteAway Quick strips. I should also mention that here has been a long enough break from Apistan and it has returned as an option for effect control of Varroa. Monitoring your hives plays a crucial roll when it comes to treatment and the application. Profilactive treatments come with a cost to the Beekeeper, they contribute to the development of resistance and impact the environment.

In Ontario the Ontario Bee Breeders Association established a program the Ontario Resistant Honey Bee Selection (ORHBS). This program has succeeded in producing highly hygienic bees and now select for 95% genetic behaviour. Genetic behaviour is the ability for the bees to identify and eliminate defective and diseased brood. This has had a big impact on diseases like AFB, EFB and chalk brood.

The less we have to treat the better off we are. Each and every treatment has a cost to the beekeeper and the environment as well as stress on the colony. For example thymol/Thymovar the active ingredient derived from the herb thyme shows promise. It's a botanical treatment so more environmentally friendly but costs nearly twice as much per hive compared to treating with Apivar.

In summary I am aware that rules and regulations here in the UK differ from those in Canada. This article reflects my experience beekeeping in Ontario but the principals are the same. It's important to consider an IPM of your own. Research and education in products and technique are crucial. It's important to keep an open mind and consider all the options available to you. Myself, although I had heard of Shook Swarms I was recently introduced to using them in the spring to control varroa. It eliminates the need for any chemical treatment and at very little cost. It might not be right for every beekeeping operation but it's a new and effective option at my disposal.

Waxing scientifical: Semen found to protect bees from disease

Sue (@beesupontheroof) reporting on recent bee-related science and research developments. Do contact her if you have any requests.

Sue Lee
LBKA member

Scientists in Australia have discovered antibodies in bee semen that could help protect commercial hives from *Nosema apis*, which is one of the most common and widespread of adult honey bee diseases. The dormant stage of *N. apis* is a long-lived spore which is resistant to temperature extremes and dehydration. The fungus may be transmitted through sexual contact and also contact between worker bees, which are infected through spores shed around flowers. Once inside the digestive stomach of infected bees it damages the gut. Nosema seems to be more prevalent in older bees which go out of the hive to collect pollen and nectar. It has been proved that newly emerged bees are always free from infection. Spores must be swallowed by a bee for the infection to be initiated. Post infection bees tend to die far away from the hive, as when they leave they are too weak to return. This may result in colony collapse.

The immune proteins, which protect queen bees from the Nosema fungus after mating, were identified by researchers at the Western Australian Centre for Integrative Bee Research. Researchers were examining bee semen to find a cure to declining rates of bee fertility in Western Australia. They were using this because it was easier to put seminal fluid under a microscope. Apparently the scientists collected around 200 drones, placing them in a cage for 10 minutes before inducing ejaculation by gassing them with chloroform, they then squeezed the fluid from the drones with a pipette. No-one should ever claim that science is glamorous.

The director of the centre, Prof Boris Baer said,

"The bees very rarely have sex, only the queen will sex and then only once in her life, so most of the time the Nosema is not spread through sexual contact, it is worker-to-worker, We can basically examine the function of the immune system outside of the bee, which believe me is much simpler than examining it in the entire bee," he said. "If we use the seminal fluid against other microbes, things that are really ubiquitous like yeast, it's not killing those microbes, it's really only responding to this disease," he said. "There's a great degree of specificity there."

One of the proteins attacks the fungal spores by tricking it into germinating early while a second kills the spores outright. "Ejaculation is fatal for the male honeybee causing major trauma and tissue damage and allowing contamination by the spores," Dr Baer said.

The new research used florescent dyes to distinguish between live and dead spores, which allowed the authors to quantify what effect the semen had on the spores.

"We found as soon as you present seminal fluid to these spores the spores are killed and the exciting thing is they're killed at a very high proportion," Dr Baer said.

Finding this agent is of interest not just because of the response against Nosema, but because it indicates that the bees are utilising a complex immune response. There will certainly be other mechanisms for resisting pathogens. Scientists are now looking for proteins and enzymes which may act against other diseases including those spread by Varroa destructor mites.

"Sooner or later we will find the bee that is able to defend against Varroa and that will be a much better approach than us throwing chemicals at the bees all the time, which can weaken the bees and also find their way into honey, which people don't like," Baer said.

"For us it's very exciting because if we are looking at bees, the worldwide population of bees is declining, which has impacts on plant pollination and agriculture. Pathogens play a major role in that decline and here we find the bee is able to defend itself."

Honeybees have a sophisticated immune system and could potentially breed to be resistant to certain pathogens, which could help prevent the worldwide decline in bee numbers. Any potential avenue for research offers hope.

The Bulgarian Beekeeper: Bee Pollen

Vesko is back! After a year of recounting apiary jobs for Bulgarian beekeeping, he now turns his attention to products of the hive. This month, it's bee pollen.

Vesko Starchikov
LBKAmember

Bee pollen is a compound consisting of pollen that worker bees mix with secretions of the salivary glands

Bee pollen

External pollen traps

and nectar, they roll it in honey and make granules (pellets) with size 1-2mm and weight 5-6mg. Bees use pollen as food for growing larvae, to produce wax and royal jelly. Humans use it as a dietary supplement.

Besides the indisputable advantages in nutrition, bee pollen has many health benefits. Pollen has a beneficial role in human bones. It also helps with various diseases of the circulatory system – stimulates red blood cell formation, strengthens blood vessels walls and the immune system. Bee pollen makes the heart stronger and normalises high blood pressure. It is very rich in selenium, which acts prophylactically in some cancers and reduces the level of histamine (substance causing allergy problems such as hay fever and rashes in humans).

The recommended daily dose is about 15-20g for a period no more than 3 months. Doctors advise to take bee pollen to be primarily during seasonal changes (winter to spring). People who want to eat healthy take bee pollen because it contains a wealth of minerals (zinc, magnesium, potassium, copper, chromium, calcium, silver and others). Bee pollen is rich in vitamins A, B1, B2, B5, B8, C, D, E.

The role of bee pollen in healthy eating

Bee pollen contains many minerals like potassium, magnesium, titanium, silver, zinc, copper, chromium, vanadium, cobalt, molybdenum, nickel, gallium, zirconium, manganese, phosphorus, silicon, calcium, iron, aluminum, barium. Fresh pollen contains: 20-40% protein substances; 30-60% natural sugar; vitamins C, B1, B2, B5, B6, B8, E; provitamin A, folic acid, biotin, tocopherol; enzymes; antibiotic substances; minerals; biologically active substances; lipids, aromatics and pigment substances.

Carbohydrates such as glucose, fructose, sucrose, arabinose, ribose, lactose, raffinose, stachyose, xylose, dextrin, starch, cellulose and lactose are an important ingredient of pollen cells. It also contains essential amino acids:

- arginine - an average of 4.7 mg;
- isoleucine – 4.7mg;
- histidine – 1.5mg;
- leucine – 5.6mg;
- Lysine – 5.7mg;
- methionine – 1.7mg;
- phenylalanine – 3.5mg;
- threonine – 4.6mg;
- Tryptophan – 1.6mg;
- valine – 6.4mg;
- alanine, glycine, asparagine, glutamine, serine, proline, tyrosine, cystine, cysteine.

Internal pollen traps

Healing Properties

Bee pollen has a curative effect. It contains vitamin E which is beneficial for the bone system, and increases potency. Routine strengthens blood cells, reduces bleeding and normalizes high blood pressure. Pollen is rich in lecithin - it normalizes fat metabolism, helps in regulating the weight and eliminates cellulite. Another ingredient of pollen is selenium, which acts prophylactically in some cancers and helps the body get rid of heavy metals.

Medical Use

- use in the treatment of diabetes disease, as they stimulate the release of insulin
- thanks to the rich content of iodine it can be used in the prevention of endemic goiter
- treatment of various diseases of the small and large intestine (constipation and colitis)
- the content of iron helps in the treatment of anemia
- reducing the level of cholesterol, which is used in the treatment of atherosclerosis
- it is low in sodium but contains lots of magnesium and potassium, which makes it suitable for the treatment of cardiovascular diseases
- prevents premature aging of cells and energize the growth of new tissue. It smooths wrinkles and stimulates blood flow to all the cells of the skin
- it is useful for the treatment of symptoms such as fatigue, allergies, and other respiratory diseases (e.g. bronchitis, sinusitis and cold).
- for neurasthenia and depressive states
- particularly useful for athletes and people in recovery after illness.

Side Effects

Side effects of bee pollen include abdominal pain, an unpleasant taste in the mouth, nausea. Cure flatulence and diarrhoea are possible in the early days of usage. The pollen should be diluted otherwise abdominal pain may occur.

Drug Uses and Dosage

Daily dosage for adults is 15 - 20g dried pollen for a period of 1 to 3 months. It is recommended to be taken during seasonal changes – autumn to winter and spring to summer.

- Children 3-5 years - 5-10 grams daily;
- Children 6-12 years - 10-15 grams daily.

How to collect bee pollen

Bee pollen is collected with a pollen traps. Pollen traps are placed inside the hives when there are reserves of 3-4 frames with fresh pollen in bee colonies.

There are two types of pollen traps:

- External – placed outside in front of the hive entrance
- internal – placed inside of the hive entrance

Bees collect pollen in sacs that are attached to their legs. They are forced to crawl through the grid of the pollen trap in order to enter the hive. The grid's openings are precisely calibrated with a diameter of 5-5.3 mm. The openings are so small that some of the pollen pellets are stripped from the bees' legs and fall into a collection tray.

Bees collect pollen most actively in spring (April, May and June), when there are many flowering plants. Depending on the type of plant the pollen colour is white, various shades of yellow, brown and red to black.

Pollen should be collected from the collecting trays daily

Crown board with eke on one side.

Plastic rhombus escape and circular escape.

in a humid climate and less frequently in dry climates. Bee pollen should be dried or placed in a dry and warm place at a temperature not higher than 40°C to avoid the deterioration of its quality, the occurrence of bacteria and fungi. During the drying it can be used infrared lamps but not direct sunlight, as it breaks down nutrients in pollen. Bee pollen should be stored in sealed glass jars or preserved by mixing with honey (1kg pollen + 1kg honey). The mixture of honey and pollen should be stored in the shade in hermetically sealed containers up to 15°C.

You can never have too many Crown Boards

Simple DIY for beekeepers.

Geoff Hood
LBKA member (London, N11)

A few years ago I found myself to be in urgent need of

Hive division

Nuc-to-national combining board

Making a crownboard. From the top left: a plain 46cm plywood board; temporally nailing the strip of to one edge in the corner; trimming the strip so it's flush with the edge; repeat for side 2; repeat for side 3; remove the temporary strip and complete slide 4.

a crown board. My planning is never that good and – as usual – I had run out of beekeeping kit.

I phoned up a big retailer and ordered a crown board to be sent next day. Ouch! It cost more than I thought at £21.50 (including postage) at today's prices! However within 12 months, the crown board had lost a rim strip and when left it outside the hive for a week, it got very damp and the thin ply warped making the crown board unusable. I wondered if it would be cheaper to make my own. However, I have few DIY skills. Sawing a 46cm square of plywood for a crown board by hand was a definite no-no and using the circular saw I got for Christmas many years ago would have sent me straight down to A&E (minus a few fingers).

But I still wanted to make my own crown boards, so I decided to make them using 12mm ply not the thinner ply in proprietary boards. B&Q price was £23 (today's prices) for a 1220×2400mm sheet and £22 for thinner ply. My DIY crown boards may be heavier but they warp less. B&Q will normally cut your ply sheet for free into 46cm squares though some retailers charge The sheet of ply makes ten 46cm square boards and with the bits left over I make dummy boards. Other timber merchants may do it cheaper, so look around.

The initial cost is £2.30 per 46 cm flat board. These flat board without bee space can be useful just on their own. I have half a dozen and use them to top and tail or dividing supers full of honey when transporting or short term storage to keep wasps and bees out, (no need to use proper crown boards and have to seal the porter holes with gaffer tape).

The 5mm to 9mm bee space rim caused me a problem for a while because 6mm or 9mm pine strip wood is not readily available. However a smaller retailer had crown boards for sale with 10mm pine strip rims and they worked without too much extra brace comb. B&Q again was my suppler at £2.75 for 18mm×10mm pine strip wood in 2.4m lengths (provides five side strips).

I don't measure the strip wood because when measuring a length of wood twice or thrice then I get different measurements each time (LOL). What I do is take a

Making split board.

short off-cut of the strip wood and I temporally nail it to one edge in the corner. Then pin and glue the next strip of wood to one edge at right angles to the temporary. I tend to use 18mm frame pins with Evostick outdoor PVA wood glue, but gorilla glue is better. I then use a handsaw to trim the strip level to the side of board. I then repeat for side two and side three. Once three sides are made, I remove the temporary off-cut and complete side four.

You now have a one sided solid crown board. Do you require it double sided? Well you don't need it double do you? How many times do you turn it over on your hive? I never turn any of my proprietary double sided boards over; the double side seems just to be there just to reinforce the thin ply and stop it warping. If you place a super on a flat crown board the super provides a bees space as it is bottom bee space, place it on a proprietary board and you had double bee space. Why is double bee space needed?!

You now have to cut the feed holes. Neither you or I are going to accurately cut out those funny porter escape holes are we? You would have to measure the hole, calculate where to drill the two end holes and fret-saw out the waste! No! To drill the hole, find the centre of the board by drawing lines from corner to corner and drill a 70mm (or 3") hole with a hole saw or just two 30mm holes with a wood drill bit. A 70mm is better because you can buy a circular escape from Thorne for £5. But I don't buy the escapes as I make my boards into rhombus escape boards (see below).

One thing I have always made is ekes for the Apiguard tray. But I end up with a wobbly square made out of 25mm × 18mm planed wood (£3.50 for 2.4m) that didn't quite fit due to poor measuring. Then they go trapezoid when you pick it up and falls apart after a year or so. However, if you nail and glue the api eke to the flat side of your crown board, it lasts for years, and you have a multi-purpose combined crown board and eke that won't fall to bits or be wobbly. It is always on the hive and you use it by just turning over your crown board and putting your Apiguard tray on the frame tops.

This multi purpose api eke & Crown board can now be turned into an efficient clearing board using a plastic Rhombus (Thornes £2,37 figure 7) The rhombus is screwed over the 70mm hole and is easily slipped off the screws to convert it back to an api eke crown board A rhombus clearer (figure 8 a) can clear bees down quicker than porter escapes. These are now my standard board as they are crown board, feeder board, api eke and rhombus clearer. (if you haven't a 70mm/3" hole saw then drill three smaller holes in a 3" triangle and cut the triangle away,)

We can also make other boards from the basic flat sided crown boards, such as a split board (sometimes called a simplified Snelgrove board) and it is used for vertical artificial swarm control on small tight apiaries when you cannot do a full artificial swarm by the Pagden method.

In order to make a split board make a standard flat one sided crown board but don't drill the hole. On the other side fix the 18×10mm strip with wood screws but **not glue**, 5 screws per side with one of screws in the middle of each of the sides,(figure 8) Then carefully cut entrances with two parallel diagonal saw cuts across the strip wood. Want to make a full double sided Snelgrove board? Starting with a flat sheet, instead of gluing one side, just attach a strip, cut entrances on both sides, drill your 70mm hole and cover with Varroa mesh to provide the Bee contact. That is under £10 for a Snelgrove board that retails for £35!

Is there anything else we can build? Yes! Canadian

escapes, Hawsey boards, hive division base boards, nuc-to-national combining board and cheap solid floors! So you might need all those ten 46cm square of plywood after all!

So as my Tutor used to say, "you can never have enough crown boards". However, some of his crown boards were made of lino or sacking. . . now that's another article.

Using Oxalic Acid to Kill Varroa

Emily Scott's blog entry in last month's newsletter (http://adventuresinbeeland.com/2016/01/05/) reported on research from the Laboratory of Apiculture and Social Insects' (LASI) that concludes that sublimation is a more effective means of applying Oxalic Acid. LBKA member Paul Hurd contacted Professor Francis Ratnieks from LASI for clarification.

What follows is an article that he and his colleagues wrote – originally published in BeeFarmer – in a more beekeeper-friendly way than the original article. There is also a pamphlet that gives specific instructions. Thanks to Francis Ratnieks for his permission to republish these.

Francis Ratnieks, Luciano Scandian and Hasan Al Toufailia
Laboratory of Apiculture and Social Insects (LASI), University of Sussex

Research at the Laboratory of Apiculture and Social Insects (LASI), University of Sussex, shows that of the three application methods being used by beekeepers to control varroa with oxalic acid (trickling, spraying, sublimation), sublimation is the best in all respects. Sublimation is effective at lower doses, causes no harm to the bees and results in colonies with more brood in spring. Spraying significantly reduced colony survival. Application of 2.25g oxalic acid via sublimation to broodless colonies in winter killed 97 per cent of the varroa.

Introduction

A commercial beekeeper, like anyone who relies on animal husbandry for a living, has to take animal health seriously. It is essential to keep his or her stocks alive and in good condition.

Pests and diseases are a challenge to all beekeepers. One of the most serious is varroa – the mite Varroa destructor – which originates from East Asia and is now found on all continents except Australia. Varroa was

Oxalic acid treatment methods. (Top left and right) Trickling/dribbling method and spraying method, which use oxalic acid dissolved in a solution made using equal weights of sugar and water (eg, 1kg sugar to 1 litre water). (Bottom left and right) Sublimation method, which uses a heated tool to vaporise oxalic acid crystals; photo to left shows oxalic acid fumes for illustration purposes only, as when correctly applied the fumes are contained within the hive; photo to right shows application in progress, with hive entrance temporarily sealed using foam

first detected in Britain in 1992, in Devon, and is now found throughout Britain and Ireland with the exception of some islands. Varroa mites harm colonies directly, through the harm they do to pupal worker bees in sealed cells where the female mites lay their eggs, and where the mother mite and her offspring feed on the haemolymph of the pupa. Worker bees parasitised in this way as pupae have reduced lifespan. However, the greatest harm is caused by varroa spreading virus diseases, such as deformed wing virus. Colonies with relatively low numbers of varroa can die if virus is also present, especially in winter. For many years beekeepers could easily control varroa with Apistan® strips, which slowly release a synthetic chemical (fluvalinate) that is highly toxic to varroa. However, resistance has evolved. In a recent test we did at LASI, we found that Apistan treatment killed only about half the varroa in a colony. When Apistan was first introduced, and varroa were nonresistant, the kill was nearly 100 per cent. It is not practical for commercial beekeepers to eliminate all the varroa in their beekeeping operation. What is needed is a way of keeping the varroa populations in colonies under control, so that there are insufficient varroa to cause harm.

Many control methods have been tried against varroa. Our research at LASI has focused on two of the most promising: hygienic behaviour and oxalic acid. In this article we describe a two-year research project on the effectiveness of oxalic acid and which has been published recently (Al Toufailia et al, 2015) in the Journal of Apicultural Research. The article is open access. Anyone who wants to read the original can download a pdf from http://dx.doi.org/10.1080/00218839.2015.1106777

Why Study Oxalic Acid?

LASI research on varroa control falls within our wider project, the Sussex Plan for Honey Bee Health and Well Being. The Sussex Plan focuses on two of the major challenges faced by honey bees and beekeepers: controlling pests and diseases, and improving the bee food supply. In the Sussex Plan we have been trying to carry out research with clear practical benefits. Before starting, we talked to beekeepers. It was clear that they considered varroa to be a major problem. This matched our understanding as scientists. Oxalic acid has been used to control varroa for several decades and is known to be effective. So why was further research needed? The reason is that previous research was incomplete. In particular, different application methods and doses had not been compared side-by-side to determine how effective they were at killing varroa, and the effects they had on the bees. In addition, previous research had generally determined the numbers of mites killed, not the proportion killed.

Extraction of varroa from worker bees. (Top left and right) Extracting phoretic varroa mites from a sample of circa 300 frozen worker bees using a jet of water from a hose attachment and a double screen honey strainer. (Bottom left) Varroa are washed through the first screen, trapped by the second, finer, screen, then counted. (Bottom right) After varroa extraction the bees in the sample are counted to determine the number of mites per 100 bees.

What LASI Did

We treated 100 colonies with oxalic acid on 12 January 2013. A further ten were untreated controls, making 110 colonies in total. The colonies were in ten apiaries in Sussex, southern England, 11 per apiary. The colonies were each in a single Commercial box (11 frames, volume 56 litres) with a wooden bottom board with mesh floor, inner cover and telescopic outer cover, and were similar to the colonies being overwintered by beekeepers in terms of management and numbers of bees. Colonies had approximately 5000–10000 workers. The colonies did not have any capped brood when treated. This is important. Varroa can occur in two locations in a hive: in brood cells, where the adult female mites lay their eggs and the young mites develop by feeding on the haemolymph of the pupae; phoretic, clinging to the body of an adult bee. In December and early January, when we did our study, most colonies are naturally broodless. All the colonies were checked a few weeks before applying oxalic acid. About ten per cent had small patches of capped brood. Any brood was scraped out with a honey uncapping fork. Care was taken to minimise any disturbance to the bees, and without breaking the cluster by shaking bees off the frames as is usually done during a colony inspection in warm weather. The colonies were also checked one day before each of the two samples of bees were collected to confirm that there was no capped brood. As a result, we could be sure that all varroa were phoretic. Our application of oxalic acid (technically, oxalic acid dihydrate) followed methods that beekeepers are already using. This was because our aim was not to test new methods, but to compare existing methods. In the trickling/dribbling and spraying methods, we applied 50ml of a sugar solution (1kg sugar dissolved in 1 litre of water) with oxalic acid, made 12–18 hours previously, to each colony. In the dribbling method, the lid of the hive is removed and the solution is poured onto the top bars and gaps between the top bars where the cluster of bees is concentrated. In the spraying method, the frames are briefly removed from the hive and the bees sprayed with the solution.

The sublimation/vaporisation method uses oxalic acid crystals. These were placed into the small cup at the end of the electrically-heated applicator, which was inserted into the centre of the hive below the frames. The heat causes the crystals to sublimate; that is, to turn directly from solid to gas. We used a Varrox® M3080 sublimator powered by a large 12v lead acid battery. The doses followed existing methods. In all three methods we used doses of 0.56g, 1.125g, and 2.25g per colony. For sublimation we also used a dose of 4.45g. In total, there were ten treatment groups and one control group. To eliminate any bias due to possible apiary effects, there was one colony per group in each of the ten apiaries. The weather was quite cold for England, maximum 5°C, on the day of oxalic acid application with an average maximum of 3°C over the following ten days. It is recommended to apply oxalic acid at temperatures of 4–16°C.

To determine varroa mortality we took two samples of worker bees (mean = 267 bees per sample) from each colony. The first was taken just before oxalic acid treatment and the second ten days later, when the mortality caused by the oxalic acid was over but before any capped brood was present. The samples were frozen and analysed later. The dead bees were placed into a double-mesh honey strainer. A jet of warm water from a hose nozzle was used to wash the varroa off the bees. The varroa passed through the first mesh and were trapped in the second, finer, mesh. We had previously checked this method, examining washed bees under a microscope, and had found that it extracted all

(Top left) Varrox® sublimator, 12v and 150 W. (Lower left) Close-up of the heated cup at the end of the sublimator into which the oxalic acid crystals are placed. (Top right) Lead-acid battery, 115 Ah, capable of powering the sublimator for approximately seven hours. (Lower right) Half-teaspoon measures are cheap to buy and are a convenient way of dispensing oxalic acid crystals for sublimation as half a teaspoon, 2.5ml, of oxalic acid crystals is almost exactly 2.25g.

the varroa. We then counted the varroa and bees from each sample. If, for example, the first sample had ten mites per 100 bees and the second had 0.5 mites per 100 bees, then the mortality was (10 - 0.5)/10 = 0.95 = 95%. We also monitored the fall of honey bees and mites for eight days before and ten days after oxalic acid application, the survival and strength of colonies in spring (four months after application), and if they had a queen.

Results

Initial varroa levels

In the sample of bees collected immediately before the first oxalic acid treatment, the average level of varroa was 9.8 per 100 bees, range 2–29, across the 110 colonies. This is quite a high level and meant that we had plenty of varroa to study, and to ensure adequate data for statistical analyses.

Varroa mortality

Figure 1 shows that all methods gave high varroa mortality at one or more of the higher doses. However, sublimation was more effective at lower doses. Sublimation was effective at all four doses used (0.56g, 1.125g, 2.25g, 4.5 g), trickling only at 2.25g, and spraying at 1.125g and 2.25g.

Bee mortality at the time of application

An average of only 1–3 dead bees was recovered per day per hive. This is a low number, and was generally

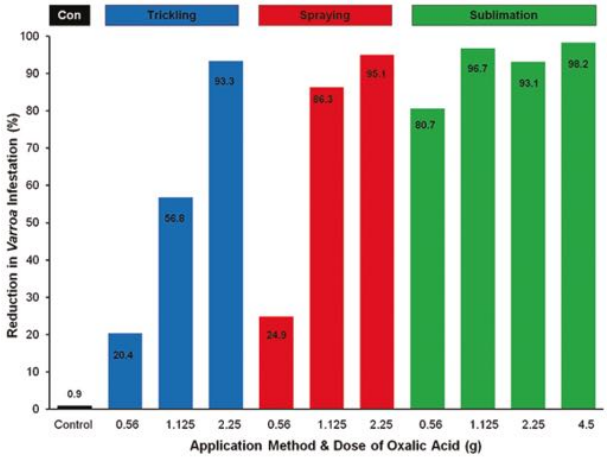


Figure 1. Varroa mortality as determined by extracting phoretic mites from samples of worker bees taken immediately before and ten days after oxalic acid treatment.

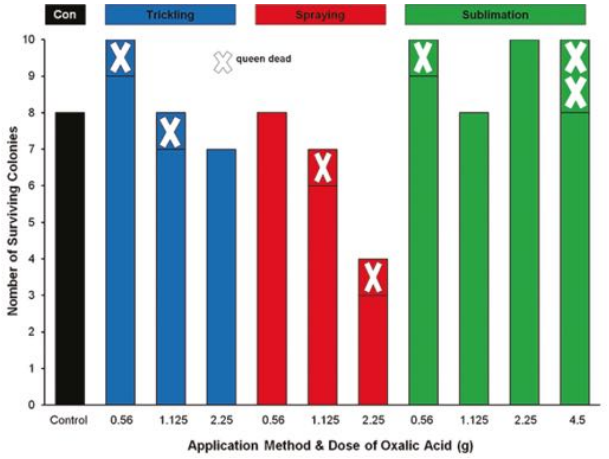


Figure 2. Colony survival 111 days after oxalic acid treatment, on 3 May 2013. Colonies marked X were alive but queenless. There were ten queenright colonies in each group at the time of treatment.

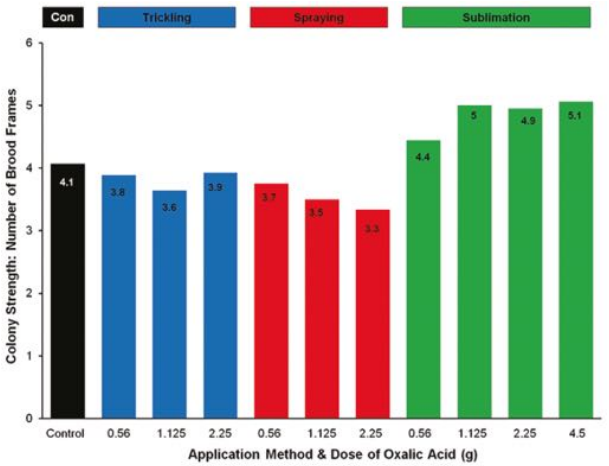


Figure 3. Colony strength 111 days after oxalic acid treatment, on 3 May 2013, quantified as the average number of frames (0.5 per side) with either sealed or open brood in the surviving queenright colonies.

no different from the control hives or from the period before oxalic acid application. The only exception to this was with spraying the highest dose, 2.25g per hive, which resulted in an average of approximately ten dead bees per day. As the hives contained 5000–10000 bees, even this method killed only one to two per cent of the bees at or soon after application.

Colony mortality after four months

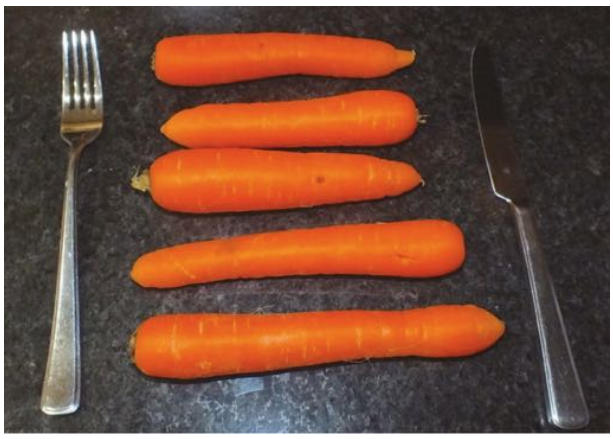
Figure 2 shows the number of colonies out of ten that survived until 3 May 2013, and if they were queen-right. Of the ten untreated control colonies, eight (80 per cent) had survived. Of the colonies treated with oxalic acid, survival was: sublimation, 38/40 = 95%; trickling, 25/30 = 83%; spraying, 19/30 = 63%. Sublimation gave the highest survival and was significantly better than spraying. Of the ten colonies treated with the highest dose of oxalic acid by spraying, 2.25g, only 4/10 survived.

Colony strength after four months

The surviving control colonies had an average of 4.1 frames with brood (counting 0.5 per side with brood present) (Figure 3). This was slightly higher than in colonies treated with oxalic acid via trickling (3.6–3.9) or spraying (3.3–3.7). However, the colonies treated via sublimation had significantly more brood (4.4–5.0 frames), an average of 21 per cent more than the control colonies for the three highest doses (1.125g, 2.25g, 4.5 g).

Checking the Results

Based on the results above from year one, we concluded that we could advise beekeepers that the best method was to treat colonies with 2.25g of oxalic acid via sublimation. Although 1.125g via sublimation also gave high varroa mortality, the highest dose, 4.45g, did not cause any harm to the bees or colonies. Therefore, it seemed reasonable to recommend the middle dose to allow a margin for error, for example in case a colony had more or less bees than average and so received a larger or smaller dose per bee. However, we first wanted to double check our results. Therefore, in mid-December 2013 we treated 89 broodless colonies with 2.25g of oxalic acid via sublimation, using the same methods as before. The average varroa level per hive was 14.5 per 100 bees (Range: 1.9–33.2%; Standard Deviation 7.7; Standard Error 0.81). Most colonies, 87 (98 per cent), survived until spring. Varroa mortality was 97.6 per cent. This convinced us that we could recommend 2.25g via sublimation, and be confident that this dose would kill most of the varroa without harming the colony.



Oxalic acid is a natural chemical. One pound of carrots (0.45kg), the amount shown, contains approximately 2.25 g oxalic acid. This is enough to treat one honey bee colony.

Conclusions

Our conclusions are simple. The sublimation method is the best in all respects. It results in varroa mortality that is as high as the trickling and spraying methods, but at lower oxalic acid doses. It gives the highest colony survival four months later, in spring, and results in colonies with significantly more brood than untreated control colonies or colonies treated by trickling or spraying.

Based on these results we recommend that beekeepers do not use the trickling or spraying methods. In particular, the spraying method harms colonies and results in significantly lower colony survival over the next four months compared to sublimation. A bonus of the sublimation method is that the hive does not need to be opened for application, and it is generally the quickest method, taking about three minutes per hive. Most of the time is taken waiting for all the oxalic acid to sublimate, which takes a few minutes for 2.25g.

Our results showed that colonies treated via sublimation had more brood in spring than control colonies or colonies treated via trickling or spraying. We do not know why. But a likely reason is that sublimation-treated colonies were healthier than control colonies, as most of the varroa had been killed, and so built up faster. There was quite a high level of varroa before treatment, 9.8 per 100 bees on average, and these would not have been killed in the control hives. Although trickling and spraying also kill varroa, the harm they do could have cancelled out the benefit of killing the varroa.

Oxalic acid treatment via sublimation requires the beekeeper to buy or borrow an applicator. Most are heated electrically and need a 12v supply. We used a 12v 115 Ah lead-acid 'leisure' battery, of the type used in a caravan and effectively the same as a normal car or truck battery. The Varrox® M3080 sublimator we used was rated at 150 W, meaning that it draws a current of 150/12 = 12.5 A. A fully-charged 115 Ah battery would be able to power the applicator for 115/12.5 =

9.2 hours. At three minutes per colony this would be enough to treat up to (60/3) x 9.2 = 184 colonies. In other words, a large battery would be enough for a full day's work treating colonies. Although we did not try it, a petrol generator could also be used. However, it would seem to be less convenient than a battery and the noise and vibration might annoy the bees.

Oxalic acid is a natural chemical, and is found in honey and in many vegetables. Carrots contain 0.5g oxalic acid per 100g (information from Wikipedia). Therefore, a 1lb (0.45kg) bag of carrrots would contain precisely 2.25g, or enough to treat one colony. The lethal dose for humans is 0.6g per kg (information from Wikipedia) meaning that a beekeeper weighing 70kg would need to swallow 42g to have a 50 per cent chance of dying.

However, oxalic acid is harmful to the eyes and mucous membranes. It is important not to breathe in oxalic acid, both the powder and the fumes. We found that it took only a few seconds to place the oxalic acid crystals into the applicator cup and to insert the applicator into the hive. As a result, we found that even if the applicator was already hot it could be inserted into the hive before oxalic acid fumes were produced, so that all the fumes were confined to the hive. We temporarily sealed the hive entrance using pieces of foam so that the vapour was confined within the hive. It is recommended to keep the entrance sealed for a few minutes, even up to 10–15, after the applicator is removed. As we applied oxalic acid in winter on cool days, there was no foraging activity to disrupt by temporarily closing the entrance.

The administrative position of using oxalic acid to treat colonies to control varroa varies from country to country. In Britain, a registered oxalic acid product, Api-Bioxal, was approved in 2015 by the Veterinary Medicines Directorate (VMD). Api-Bioxal consists of oxalic acid dihydrate (88.6 per cent by weight), plus small amounts of silica gel and glucose. The latter materials would seem not to be toxic to varroa. The official recommendation, for sublimation, is to use 2.3g to treat one hive. This corresponds to 2.3 x 0.886 = 2.04g of active ingredient. Our research used almost exactly this amount.

The VMD approval document states: 'When handling the powder (both during vaporisation phase and pretreatment phases) wear protective mask conforming to European Standard EN149 (type FFP2)'. This official information seems to be incomplete, as EN149 protects the operator from dust and powder inhalation. When oxalic acid is sublimated, the crystals will form a gas. The gas then condenses to form a white smoke, which is presumably composed of minute particles. Ideally, beekeepers would use a mask that conforms to the EN149 standard but which also provides protection against organic chemicals and acids in vapour/gas or 'smoke' form.

Here at LASI we find that applying oxalic acid via sublimation is simple and can be done by one person. We recommend applying 2.0–2.5g of oxalic acid via sublimation to broodless colonies in winter. If the applicator is cold it will take several minutes to heat up, and then several minutes to vaporise the oxalic acid. If the applicator is on and hot the oxalic acid will start to sublimate within seconds, and so will need to be inserted into the hive entrance right away so that all the oxalic acid vapour is confined within the hive.

Because beehives are treated outdoors, with the oxalic acid being applied within the hive, there is no need for the beekeeper to be exposed to oxalic acid fumes. Similarly, there is no need for the beekeeper to be exposed to oxalic acid in a way that would make it easy to swallow or breath in oxalic acid crystals when loading the applicator for sublimation. During application, and for up to 10–15 minutes after, seal the hive entrance with foam. LASI has prepared a pamphlet, How to Apply Oxalic Acid Via Sublimation to Control Varroa (page 28). Because oxalic acid only kills phoretic mites, for maximum effectiveness it is necessary to treat broodless colonies. By means of hive inspections in late autumn and winter, beekeepers can determine when the natural minimum brood period occurs in their area. However, brood rearing may vary year by year. In the winter of 2015–16 we found that brood rearing in Sussex continued longer into December than usual, and resulted in our delaying oxalic acid treatment. This was probably due to the very mild autumn, with weather warm enough for foraging throughout December, plus prolonged flowering of ivy, the main autumn flower source, into early December.

Ideally, colonies should be checked immediately or a few days before before oxalic acid application and any patches of brood scraped away or removed. Although it is extra work, it is worth doing as even small areas of capped brood will allow many adult female varroa to escape the oxalic acid. Our results showing 97 per cent varroa mortality apply to broodless colonies.

It is good to have results worth sharing with beekeepers, especially as the Sussex Plan for Honey Bee Health and Well Being is aimed at providing practical information. When we started our research on varroa control we never imagined that we would be able to make such a clear and simple recommendation. That is, to have solid evidence that one application method was the best in all respects: killing varroa, not harming the bees, resulting in stronger colonies, and in being quick and easy to apply. That method is sublimation. It is fortuitous that we are publishing our results just a few months after oxalic acid has been approved for use to control varroa in beehives in the UK.

Reference

Al Toufailia, H, Scandian, L, Ratnieks, FLW (2015). Towards integrated control of varroa: 2) comparing application methods and doses of oxalic acid on the mortality of phoretic Varroa destructor mites

How to Apply Oxalic Acid Via Sublimation to Control Varroa

Varroa mites are parasites of honey bees. They harm colonies by weakening the bees they feed on and by spreading virus diseases. Beekeepers use several methods to control varroa, including the natural chemical oxalic acid (OA).

Hives are treated with OA by *Trickling*, *Spraying*, and *Sublimation* (also called *Vaporization*). Trickling and spraying apply OA in solution. In sublimation, OA crystals are heated with an applicator tool. The heat causes the crystals to sublimate (turn directly from solid to gas). LASI research compared these methods at several OA doses. Sublimation was best: killing varroa at lower doses, not harmful to the bees, and not needing the hive to be opened.

Trickling. Hive opened and oxalic acid solution poured onto the bees.

Spraying. Frames lifted and OA solution sprayed onto bees.

Sublimation. Tool in hive entrance vaporizing OA. Foam seals entrance.

Phoretic. Varroa clinging to adult bees can be killed by OA.

In Cells. Varroa in capped cells are not killed by OA application.

Mask. For safety, use a mask that protects against dust and fumes.

Applicator Tool. Varrox M3080, 12 volts, 150 watts, as used at LASI.

Battery. This 12v lead-acid battery can power the tool for 8-9 hours.

Half teaspoon measure, 2.5ml, is c. 2.25g OA. OA stored in airtight jar.

To apply OA via sublimation you need: 1) applicator tool (several types are sold); 2) battery to power tool; 3) oxalic acid (technically "oxalic acid dihydrate"); 4) mask; 5) half teaspoon measure; 6) foam to temporarily seal hive entrance.

Place half teaspoon (2.0-2.5g) of OA into the holder at the end of the applicator. Insert applicator into hive entrance and seal entrance with foam. If the applicator is cold it will take several minutes to heat up, and then several minutes to vaporize the OA. If the applicator is on and hot the OA will start to sublimate within seconds. Make sure the applicator is in the hive before OA vapour is produced so that it is confined to the hive. During and for up to 10-15 minutes after application, seal the hive entrance with foam.

Apply OA to broodless hives. If capped brood cells are present, many varroa will be in these and will not be killed by the OA. LASI finds that December is the month with least brood, but that late autumn and winter brood rearing varies year to year. It is best to check hives immediately or a few days before OA application and remove or scrape out any small patches of capped brood. It is recommended to apply OA at outside temperatures of 4-16C.

LASI finds that applying OA via sublimation is simple and can be done by one person. The main disadvantage is the need for the tool and battery. Take care as the tool gets hot! LASI recommends 2.0-2.5g OA via sublimation to broodless hives in winter. LASI's research was published, open access, in the *Journal of Apicultural Research*: http://dx.doi.org/10.1080/00218839.2015.1106777

Key Results of LASI Research Comparing Oxalic Acid Application Methods

* 2.25g OA applied to broodless winter hives via sublimation killed 97% of the varroa.
* Colonies treated with OA in winter via sublimation had 20% more brood in spring than those treated via trickling or spraying, or untreated control colonies.
* Sublimation is effective at killing varroa at lower doses than trickling or spraying.
* Sublimation has no negative effect on colony winter survival or bee mortality.
* The exact amount of OA used is not critical. 1.125g and 4.5g were also effective.

Oxalic Acid Safety

* OA is a natural chemical, and is found in honey and most vegetables.
* Carrots are 0.5% OA. One pound contains enough OA, 2.25g, to treat one hive.
* OA is toxic. It is estimated that 45g, enough to treat 20 hives, would kill if eaten.
* OA is more harmful if breathed in, as it affects mucous membranes.
* When handling OA crystals, wear a protective mask to protect against dust.
* During sublimation, wear a mask that protects against dust and organic acid gases.

Official Regulations of the UK Veterinary Medicines Directorate

Please check the regulations in your country, as these vary. In the UK, a registered OA product, Api-bioxal, was approved in 2015 by the VMD. Api-bioxal is oxalic acid dihydrate (88.6% by weight), plus silica gel and glucose. The sublimation recommendation is for 2.3g Api-bioxal (= 2.04g OA) per hive as a single administration, one treatment per year. 2.3g Api-bioxal contains 2.04g OA. Api-bioxal is the only form of OA that may legally be applied to hives to control varroa in the UK.

US University of Sussex Life Sciences

LASI does research on honey bees & social insects, trains students, & provides outreach. This Information Sheet was written by Professor Francis Ratnieks & Hasan Al Toufailia and sponsored by the Eva Crane Trust. LASI research on controlling varroa with OA was funded by Rowse Honey, Burt's Bees & The Esmée Fairbairn Foundation. www.sussex.ac.uk/lasi

LASI Laboratory of Apiculture and Social Insects

and their honey bee hosts. *Journal of Apicultural Research*. http://dx.doi.org/10.1080/00218839.2015.1106777

February Facebook (In)digest(ion)

A quick roundup of was happening on our open Facebook page last month.

Eugene Fahy
LBKA member

The month opened with a post on what seems to be a frequent occurrence, vandalism and thefts of hives. Tim Hill posted alerted the forum about three hives which were stolen from an allotment in Middlesbrough – a reminder to those of us with out-apiaries or apiaries accessible from public areas to be vigilant. Andrea Quigley shared number of items from the International Bee Research Association (IBRA). The first was about a honey bee gene bank which is being set up by the US Agricultural Research service. The National Bee Genebank will based at Fort Collins, Colorado and it aims to preserve the genetic diversity of honey as a means of combatting colony loss due to pests and disease. There was an item about the sustainability of beekeeping in the 21st Century, with a link to a youtube video (https://m.youtube.com/watch?v=dL6esUz6k04) and finally a report of Small Hive Beetle being found in Brazil; the IBRA had been aware of reports but was forbidden to say anything until there was official confirmation.

Jon Harris and Andrea both shared items which blamed beekeepers and imports of honeybees, and colony movements for the spread of varroa and associated diseases, such as deformed wing virus (DWV). The report was based on the results of research carried out by teams based at the universities of Exeter, Sheffield and Salford. The study collected samples of bees and varroa from 17 countries and found a close correlation between the spread of varroa and the spread of DWV.

Frank Ryan started a debate by asking why the v-shaped sidebars in hive frames are pointed in opposite directions. A number of explanations were offered – only having one type of side-bar (rather than having left and right) makes it cheaper to produce, the small contact area of the V and flat surface reduces both propolis and the likelihood of squashing bees and finally, it makes the frame reversible so you can replace it without having to think about it.

In mid-month, Sarah Ward checked for food stores on her hive. There was partially eaten fondant on the crown board but no bees visible through the opening. On partially opening the crown board, Sarah disturbed a small cluster which was then alerted to the fondant and started feeding. This was a timely reminder to check our colonies.

Big Dreams for Small Spaces, presented by Monty Don, featured in a post by Bill Fitzmaurice. The series helps give small gardens and spaces a facelift. And the edition which aired on 18 February included a piece in which Nighat Hasnain found space on an allotment for her bees. Her interest in beekeeping came initially from hearing about Bees for Development and attending a weekend seminar hosted by Monty who is a patron of the charity.

Also in the media, Geordy Mark took part in a Radio Wolfgang (https://radiowolfgang.com/) discussion about urban beekeeping and forage.

A post promoting the Flowhive as "the beekeeper's dream" attracted some dissenting opinion. Mark said it was a nice concept but honey from ivy and rape would clog the mechanism and pointed out that urban beekeepers need to do frequent hive inspections.

An interesting statistic taken from Dave Goulson's book "A sting in the tale" is that if a buff tailed bumblebee was as big as a human, it would burn off the calories in a Snickers bar in just 20 seconds, even while standing still. A human would have to run about 4km to achieve the same result. Apparently a bumblebee is never more than 40 minutes away from starvation.

Finally, Felicity Millward, is a photographer who wants to document beekeeping in London, with a view to publication. If you are willing to be photographed contact fliss2389@gmail.com, examples of her work are on her website http://www.felicitymillward.com.

Adventures in Beeland: Notes from a talk by Norman Carreck

LBKA had its Winter Lecture last week, when Norman Carreck from the International Bee Research Association spoke about colony losses, native bees, pollen diversity and the small hive beetle. It was very interesting and very well-attended. Fortunately, Emily also went and wrote it up on her excellent blog http://adventuresinbeeland.com/2016/03/04/.

Emily Scott
LBKA member

Yesterday I went to a talk by Norman Carreck, which was organised by the London Beekeepers Association (LBKA). One of the great things about being a beekeeper in London is being able to hear expert speakers like Norman. He is currently Science Director of the International Bee Research Association (IBRA), based at the Laboratory of Apiculture and Social Insects at the University of Sussex. He has kept bees since he was 15, obtained the National Diploma in Beekeeping in 1996, is a member of the Technical and Environmental Committee of the British Beekeepers Association, a member of the Examinations Board for the National Diploma in Beekeeping, a member of the "Bee Health Advisory Forum" for the Defra "Healthy Bees Plan", the UK member of the Executive Committee of the international honey bee research network "COLOSS" and Senior Editor of the Journal of Apicultural Research.

Despite all Norman's achievements he came across as an unassuming and modest speaker, who took plenty of time to answer everyone's questions afterwards. His talk was about research projects carried out by COLOSS (which stands for Prevention of honey bee COlony LOSSes), on the themes of colony loss monitoring, local bee vs imported bee survival, pollen diversity and the small hive beetle.

How COLOSS works

It's an international, non-profit association set up following the publicity surrounding colony collapse disorder in 2006, when many beekeepers first reported losing large numbers of colonies. There are 722 members in 89 countries worldwide, with membership open to scientific professionals interested in the well-being of bees. COLOSS holds regular meetings, but has very little money, so the individual members fund themselves to attend. Norman told us that in a way this lack of money is an advantage – as it means members aren't competing with each other for central funding from COLOSS, which encourages mutual cooperation.

Colony loss monitoring

To try to gather data to establish whether honey bee losses are a genuine global phenomenon, COLOSS members came up with a standardised questionnaire for beekeepers. A lot of thought went into the questions in order to take account of the differing lengths of international beekeeping seasons and practices. Norman mentioned that although both the British Beekeeping Association and National Bee Unit do annual surveys which ask beekeepers some of the same questions, COLOSS has had difficulty getting the results of these surveys – which has been a frustrating situation.

The surveys carried out so far indicate that colony losses do in general seem to be higher than 30 years ago – but there are no obvious patterns to this – with losses varying between countries from year to year. Climate itself doesn't appear to be a big factor, as beekeepers have developed their own systems to cope with their particular climates. Weather is important but doesn't explain all the losses. Varroa is very important, with higher losses occurring when beekeepers don't treat against mites. Areas of intensive agriculture also tend to have high losses – this may be due to a lack of forage diversity for the bees, particularly at times of the year when the main farming crops have finished flowering. The most recent results available are for losses over the 2014/15 winter.

A female varroa mite - ©Crown copyright 2010. Courtesy The Food and Environment Research Agency (Fera), Crown Copyright.

Are people keeping bees suitable for where they live?

COLOSS scientists wanted to compare how successfully individual strains of the European honey bee (Apis mellifera) cope in a range of environments. To do this they set up an experiment comparing 16 genetically different strains at 21 locations, across 11 European countries. At each location, a local strain of bee was compared with two other strains. For three years, six colonies of each strain (so 18 in total) were monitored for honey production, disease, colony size etc at each site. They were not treated for varroa, which meant several died early on.

The results of this study were published in a number of papers, including 'The genetic origin of honey bee colonies used in the COLOSS Genotype-Environment Interactions Experiment: a comparison of methods' (Francis et.al, 2014) and Honey bee genotypes and the environment'. Across all the locations, there was no one strain that consistently had better survival rates. BUT there was a statistically significant difference between the survival rates of local and non-local bees – local bees survived longer. One reason for this could be that local bees have adapted to cope with local strains of pathogens. Whatever the reason, the study indicated that local bees do better. Food for thought for beekeepers who regularly import queens from the other side of the world or buy in packages from hundreds of miles away.

There has been some doubt over whether it's possible to

Andrew Abrahams

keep your bees pure, considering the queen honey bee is a promiscuous insect that will mate with as many local drones as can catch her. Andrew Abrahams is the only beekeeper on the Isle of Colonsay in Scotland and asked one of the Scottish heritage bodies for assistance in getting legal protection for his dark European honey bees. He was initially refused it and told bees shouldn't be on the island at all, but eventually he won protection in a new Scottish government order which makes it an offence to keep any honey bees on the islands except the dark European honey bee, Apis mellifera mellifera. For more on this, see:

- "Colonsay and Oronsay to become honeybee havens'' (The Scotsman, 6th October 2013; http://www.scotsman.com/news/environment/1-3128377)
- "Andrew Abrahams, beekeeper on the Isle of Colonsay'' (2 tortoises' escapade, 18 July 2013; http://elsa.ewan.free.fr/?p=5286 – a fun blog post by a pair of cyclists who visited the island).

I notice Andrew runs beekeeping courses on the island. My husband Drew spent many summer holidays as a child on Scottish beaches, including stays on Colonsay. . . hmm maybe he can be persuaded that we really need to show our new baby the beauty of the Scottish islands and their wildlife!

Anyway, a study on the 'Genetic integrity of the dark European honey bee' (Pinto et al 2014) confirmed that Andrew Abraham's bees are pretty pure *Apis mellifera mellifera*; more surprisingly, even openly mated bees from Sussex University campus had a lot of *Apis mellifera mellifera* in them. Local strains survive well. COLOSS are currently putting together a book on sustainable bee breeding, to advise beekeepers on making the most of the bees we have rather than importing them.

Pollen diversity

In 2014 COLOSS began a "C.S.I. Pollen" study asking beekeepers to help collect data on the diversity of pollen collected by their bees. To take part, each beekeeper

Small hive beetle, "Courtesy The Food and Environment Research Agency (Fera), Crown Copyright"

needed three colonies, each fitted with a trap to collect pollen on ten dates over a year. After each collection, the beekeepers were asked to separate out 20g of the pollen on a white tray and count the number of different pollen colours they could see. Norman commented that this is not a perfect test as one plant may produce pollen grains which look like different colours (for example maize pollen is darker when wet), but at least all the beekeepers have done the sampling in the same way, so the data is standardised.

During 2014, 465 beekeepers in 24 countries took part. The initial data gathered from English and Welsh beekeepers during 2014 indicated that pollen diversity declined as the beekeeping season went on. The study was expanded during 2015, with many more beekeepers from 27 different countries taking part. The original data is still being analysed and a draft paper has been written.

The surveying will continue in some countries during 2016, including England, Wales, Scotland, Ireland and France. More volunteers are needed, so contact Norman if you're interested.

Small hive beetle (Aethina tumida)

Like the Asian hornet, most UK beekeepers will be aware of these pests and the threat that they may reach us sooner rather than later. Norman described the beetles as "fairly repulsive things", which make varroa mites look attractive in comparison.

The beetle larvae hatch out in the hive and feed on comb containing pollen or honey, damaging the comb by tunnelling through it and defecating, which makes the honey ferment and run out of the combs. Heavy

infestations of the larvae turn the combs into a sloppy mess that U.S. beekeepers call a "slime out".

Once ready to pupate, the larvae leave the hive and burrow into soil, before emerging as adult beetles 3-4 weeks later. The adult beetles seek out bee colonies to mate in, then the females lay masses of eggs within cracks and crevices amongst the hive to start the cycle again.

One of the challenges in keeping the beetles at bay is that we don't know how far the larvae travel to pupate. Norman could only say that they can wander "quite a long distance". Additionally, the adult beetles fly – again we don't know how far. More research is needed to confirm this.

1996, Florida

The beetles are native to sub-Saharan Africa, where they are a minor pest but not a serious problem. As usual the activities of humans moved them around the world, with the result that in 1996 beekeepers in Florida suddenly found their colonies full of the beetles. They wiped out many colonies and rapidly spread to several different states, where they remain today.

2004, Portugal

Beetles turned up in Portuguese colonies containing queens imported from the US (another reason not to import foreign queens). Some were discovered in the cages the queens had been released from. The Portuguese authorities moved quickly to burn all infested colonies and fortunately the beetles were eliminated.

2014, Southwest Italy

Beetles were discovered in Italy in 2014, causing panic. The Italian authorities started destroying lots of hives by burning, then sprayed insecticides to kill any beetles which might have been pupating underground. They found 61 infected sites and destroyed over 3,500 colonies. However, due to the sheer number of beekeepers in the area, not all apiaries were inspected.

Around 20,000 packages of bees were exported from Italy in 2014. In the UK our National Bee Unit inspectors tracked down any packages imported from Italy and inspected them – all were found to be clear of beetles. Other countries were not so thorough; for example the Polish government said it did not have the financial resources to inspect imported packages.

To try to help, COLOSS ran articles on the beetle in IBRA's Bee World journal and organised a task force. A book called The small hive beetle in Europe which Norman has edited will be available soon. At a conference organised to debate the options available, it was clear that the patience of Italian beekeepers for the government's policy of destroying hives was wearing thin. Compensation from the government took a year to arrive and then only compensated the beekeepers for colonies destroyed, not for loss of income from queen exporting or honey sales. Rumours began that beekeepers were not reporting beetles to authorities and quietly destroying infected colonies instead (or perhaps not destroying them).

2016, Italy

Some more cases were found in December 2015. . . with virtually all sightings including adult beetles, which indicates that they're breeding. Norman suspects the chances of eradicating the beetles in Italy are slim.

Coping with the small hive beetle

African bees have developed strategies to deal with the beetles, for instance entombing them in propolis traps. European honey bees do this too, to a certain extent. So we don't entirely know why they are such a problem for European honey bees. One theory is that African plants provide more propolis, so African bees just have more of it available to contain the beetles.

After the initial problems in the US, many beekeepers there have now learnt to live with the beetles. Sloppy beekeeping seems to be the main issue which allows the beetles to get out of hand and reproduce in vast numbers. Good apiary hygiene, such as processing honey immediately, not storing old comb/keeping honey combs in fridges or freezers, helps keep numbers low. Smaller hives also assist the bees in keeping beetles contained, as does not inspecting too often (beetles are released as beekeepers move combs apart and break propolis seals open).

Norman is sure the beetles will reach the UK eventually. They are attracted to the smell of rotting fruit and have even reproduced in rotting bananas under laboratory conditions. This means they could potentially move around the world in fruit consignments or pupating in pot plants, not just through bee imports.

They like dry, sandy soil, so damp, waterlogged clay soil like we have in some areas would deter them. They could potentially do well in the New Forest, which has light, sandy soil. Unfortunately the early detection methods we have are not good. Traps work well if you have lots of beetles; but if you only have one beetle in your hive there are plenty of other nooks or crannies it could end up in. Our WBC hives would be perfect for beetles to hide in!

Members' marketplace

This section is for members selling things or selling services to others. This could include the and wax. Email services@lbka.org.uk for more details.

Frank Ryan (frankryan60@hotmail.co.uk): I would like to buy two colonies of bees for this season. Would any members would be interested in selling bees?

Upcoming events

Sunday 13th March: Monthly meeting: Swarm management

11:00-13:00 at Fairley House Junior School, 220 Lambeth Rd, London SE1 7JY

As colonies gear up for the new season, we'll be trying to keep one step ahead. This month's meeting will be about swarm management, something we consider essential to get right in our urban setting. This and and other related topics will be followed by the usual hot drinks, cake and chat. Meetings are for members only, but if you're thinking of joining LBKA, come as guest to find out more about us.

Sunday 13th March: Bee Improvement For All

10:00-16:30 at Copped Hall, Epping, CM16 5HS

Organised by Epping Beekeepers, this one-day event is aimed at beekeepers of all abilities and aims to help and encourage your assessment of bees, to seek simple methods of improvement and the rearing of queens. Roger Patterson, a beekeeper of fifty years, has a reputation as an engaging speaker and will present at the course which is organised by the Bee Improvement and Bee Breeders Association. Booking is essential secretary@eppingforestbeekeepers.co.uk and the cost is £10/£5.

Sunday 10th April: Monthly meeting: Microscopy

11:00-13:00 at Fairley House Junior School, 220 Lambeth Rd, London SE1 7JY

This hands-on session will focus on diagnosing nosema in your bees. We will have a number of microscopes for use. If you'd like to test your bees, please bring 30 or so freshly collected dead bees (kill them humanely in the fridge overnight). This will be followed by the usual hot drinks, cake and chat. Meetings are for members only, but you're welcome to come as guest to find out more about our association.

Committee

Please do not hesitate to get in touch with a member of the committee if you have any questions, requests, suggestions (and offers of help)! We are:

- **Chair:** Richard Glassborow, chair@lbka.org.uk
- **Treasurer:** David Hankins, treasurer@lbka.org.uk
- **Secretary:** Emma Nye, admin@lbka.org.uk
- **Education:** Howard Nichols education@lbka.org.uk
- **Membership:** Aidan Slingsby, services@lbka.org.uk
- **Forage:** Mark Patterson, forage@lbka.org.uk
- **Events:** Emily Abbott, events@lbka.org.uk
- **Mentoring:** Tristram Sutton, mentoring@lbka.org.uk

Our website is http://www.lbka.org.uk/.