

# BBKA NEWS

The newsletter of The British Beekeepers' Association

No: 224 - April 2017

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Incorporating B|B|J The British Bee Journal, Volume 4



## PRACTICAL ADVICE

### Swarm Control

By identifying potential swarm triggers you will be able to make appropriate responses.

PAGE 119

## PRACTICAL ADVICE

### Bait Hives

These prepared hives provide a way to attract and collect swarms that might otherwise be lost.

PAGE 125

## FEATURE

### Beekeeping Shed

When your beekeeping equipment out-grows your home, you can always build a bespoke shed for it.

PAGE 133



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# Trustees' Editorial

By David Teasdale

In my trustees' editorial, I want to make a request for your help and involvement.

The BBKA website swarm list has proved to be a very useful and valuable source of information and help to the general public. However, it only works if members get involved and request their names to be included on the list. Last year more than 2,500 members got involved, but we do need more members' names on the list to increase the national coverage.



There are benefits to be had by being on the swarm collectors' list, because even though not every call results in a swarm, some of them do. Although you might not need any bees at the time you receive a call to help, I am certain that others within your association might welcome a swarm of bees to get them started or replace losses. So please submit your request for inclusion to your area association secretary and help bees, beekeeping and beekeepers.

The BBKA website is another area where we need help. In specific, if you would like to help with editing the BBKA website, there is more information about this opportunity on page 117.



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Cover photo: Honey bee foraging on gooseberry, taken at the end of April. Photo by Wendy Johnston, Northern Ireland.

Disclaimer: Opinions expressed in articles in *BBKA News* and in *The British Bee Journal* are those of the authors and do not necessarily reflect those of the BBKA.

# Chairman's Letter

Margaret Murdin

Thankfully, all of my bees have come through the winter successfully. I have watched them as they collect pollen from the early spring flowers. Now that the days are longer, the weather warmer and there is a subsequent increase in the number of flowers, I am hoping that they will build up strongly for me so that I can start queen rearing. I did not replace my queens last year because I was moving my bees down to my new home in Oxfordshire. So this year I will need some new queens. I will raise my own in the hope that they will be adapted to my local area.



Now, over to the BBKA. I want to congratulate all of those who have recently passed their beekeeping exams. I have travelled around the country a lot this year and given out certificates to members in many areas. I have been really impressed at the depth and breadth of knowledge and the enthusiasm for continuing education and learning. We have an impressive number of new Master Beekeepers this year.

I hope the General Husbandry and Advanced Husbandry programmes that we are offering will go some way to help more beekeepers to take these assessments. These courses are intended to supplement rather than replace those already offered by area associations, many of whom already have excellent and structured learning programmes in place.

The BBKA is trying to respond to the needs of all of our members and we recognise that we cannot do this by ourselves. There are other very good organisations which members also engage with and, in the interests of being inclusive, we want to co-operate with these organisations as much as we can. The International Bee Research Association (IBRA) produces a lot of books and pamphlets that are on the reading list for our BBKA assessments, and this also applies to *BeeCraft*. We are hoping to enter into an arrangement whereby we can either sell these in our shop (the Pollen Basket) or provide a link from our website. Many BBKA members are also members of The Central Association of Bee Keepers (CABK), which has a particular interest in the scientific aspects relating to beekeeping, and BIBBA whose interests lie in raising and supporting locally adapted bees. Then there is Bee Diseases Insurance Ltd (BDI) which, as the name suggests, covers insurance for notifiable diseases.

These organisations are not competitors of the BBKA, and we want to partner with them wherever that can benefit beekeeping and BBKA members. I am sure there are other organisations that I have left out so please let me know.

Well, summer is definitely on the way. So from now on I am hoping to get my regular beekeeping 'fix'. I can finally inspect my bees on a regular basis. I hope you will enjoy your bees as much as I enjoy mine. Let us hope for a good, long, warm summer.

Margaret Murdin, BBKA Chairman

## Sugar Recycling



Photo by Ian Campbell

Beekeepers in Cornwall are benefiting from a deal with supermarket chain, Tesco, who has agreed to supply sugar from split bags and bakery surplus for use as feed for honey bees. The sugar is collected from ten west country stores by the Bee Improvement Programme for Cornwall (BIPCo) conservation charity. Lucy Hughes, a Tesco Community Manager who helped establish the scheme said: "I hope this small but important project will go some way to support our local bees and help them through the winter months." BIPCo's sister group, B4, has also received £10,000 from Tesco's 'Bags of Help' initiative which funds community projects from the proceeds of the 5p plastic bag charge. B4 is establishing a genetic research project with Plymouth University and a black bees reserve at Mount Edgcombe Country Park that opens later this year.

Ian Campbell, News Editor, *BBKA News*

## Liquid Gold

A story of bees and honey



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# News in Brief



Ian Campbell, News editor

## A Spoonful of Honey

A single spoonful of honey was recently enough to hospitalise a Hong Kong resident. Tests revealed that he had fallen victim to 'mad honey', which is produced by bees collecting nectar from a small number of species of rhododendron containing the neurotoxin grayanotoxin. Such plants are found in Europe on the Turkish Black Sea coast and also in parts of the Far East. On this occasion it appears the honey was a gift bought in Nepal by a friend of the victim. Symptoms can include a very slow heart rate, low blood pressure, nausea, hypothermia and fainting. Fortunately the patient recovered quickly and was discharged the next day. The local authorities have now issued guidance to the public following several similar incidents in the last few years.

## Help for Heroes

Twelve Help for Heroes beneficiaries and their families came together earlier this year at Tedworth House Recovery Centre, Wiltshire, for a three-day beekeeping course. The attendees were all people who had been affected by their own or their partner's military careers. The course was taught by John Geden, a former Army Captain turned bee farmer, and covered a range of topics including

honey bee history, equipment, disease management and harvesting honey. Each student was given a copy of the *BBKA Guide to Beekeeping*, donated by the BBKA. The relaxed training environment helped many overcome some of their mental health issues arising from their military careers, such as anxiety and depression. Although this first course was purely theory based, the group are looking forward to learning more later this year, with practical sessions covering beehive construction and handling bees.



Photo by Kirsty Williams

## Whooping Signal

Scientists at Nottingham Trent University have been reinterpreting a communication signal made by honey bees. Previously the short 'whoop' sound was thought to be a linked to begging for food, a stop signal to deter waggle dancing or even a warning signal of danger in foraging locations. However, the new research, published in *PLOS One*, suggests it is likely to be a reaction by bees being surprised when they accidentally bump into each other. The same sound is also produced *en masse* when a hive is knocked. The buzz, produced by the wing muscles in the thorax, is outside the range of human hearing and can occur as often as 1,000 times per minute in a single colony. The whoop appears to be produced mainly by older foraging bees and occurs most frequently at night.

## Blooms for Bees

April sees the launch of Bloom for Bees' new smart phone app aimed at identifying and helping record bumblebee species in the UK. The organisation is a citizen science project funded by the Heritage Lottery Fund and led by Coventry University in partnership with the Royal Horticultural Society, the Bumblebee Conservation Trust and Garden Organic. The app is available on the App Store and Google Play. Bloom for Bees has also produced a short video available on YouTube called Common Bumblebees of the United Kingdom, which could be very useful viewing for those whom you may suspect of mistaking bumblebees for honey bees during swarm calls.

## Bee Health Plan

A generic contingency plan for Plant and Bee Health in England has been published and can be viewed on the Gov.UK website. The Contingency Plan describes how Defra and operational partners have prepared for, and would respond to an outbreak of a plant or bee pest or disease in England, if such an event were to occur.

## Who Do You Think You Are?

Investigations at the University of California have been looking to get a more accurate picture about the early evolution and subsequent spread of western honey bees. The study, published in the journal *Genome Biology and Evolution*, combined already existing genetic data on bees from Africa, the Middle East and Europe with new information. The results paint a complex picture of different lineages of *A. mellifera* diversifying and interbreeding, which differs from earlier hypotheses. The research is expected to be of use in future management and breeding.

## BeeCare

In response to continued high honey bee losses in the US a new bee testing service has been announced. BeeCare is a collaborative project between the National Agricultural Genotyping Center, the National Corn Growers Association and the North Dakota Department of Agriculture. The service will provide quick and accurate diagnosis of nine viral and two bacterial diseases with beekeeping associations being offered preferential rates.

## Covert Stress

Joint UK and Belgian research has shed further light on the damage caused by Deformed Wing Virus (DWV), which it suggests can be present in up to 75% of all honey bee colonies world-wide, often without its classic symptom being seen. The study, published in the journal *Proceedings of the Royal Society B*, has shown that their behaviour and performance were altered following infection of with DWV type B. The infected bees began foraging younger, died younger and had a reduced time span as foragers.

# News in Brief

## Manuka ID

The *Sunday Times* recently commissioned Fera Science Ltd (Fera) to use its new Manuka testing methods to identify if some of the 20 million kg of honey consumed annually in the UK did not match the claims on the label. Concerns have existed for some time over the global sales of Manuka which appear to far outstrip production, with allegations that bulk exports may be adulterated along the supply chain.

Fera tested nine different samples of 'Manuka' being sold in the UK and found three of them did not contain compounds that make up a unique 'signature' for authentic Manuka. Some stores, including Fortnum and Mason, withdrew the affected products from sale.



Photo by Ian Campbell

A critical new test for genuine

Manuka is for leptosperin, which was identified in Japan in 2014 and is now used by Fera. The test was developed following five years of work in conjunction with New Zealand's Unique Manuka Factor Honey Association, which robustly defends products carrying its UMF quality mark. It is hoped that these and other new DNA tests, planned by New Zealand's Ministry for Primary Industries, will restore confidence in the Manuka market for a product which is in especially short supply this year following adverse weather.

## Tropilaelaps

The threat from *Tropilaelaps* mites, which, thankfully, are absent from the UK, but whose range has spread significantly during the last forty years, may be one step closer to defeat. Joint research by Xi'an Jiaotong-Liverpool University and Liverpool University, published in the journal, *GigaScience*, has analysed the genome of the most damaging of the four species of the mite, *T. mercedesae*, and found that certain plant-based compounds may prevent the mites locating and attaching themselves to honey bee larvae.

## Degraded

A new study led by the University of Western Australia (UWA), published in *Proceedings of the Royal Society B*, has looked at the impacts of land degradation on honey bee metabolism and feeding patterns. Hives were located in healthy woodland and also on land degraded by fire. Professor Don Bradshaw from UWA's School of Biological Sciences said: "*The metabolic rate of bees in natural woodland was actually significantly higher than in a degraded environment ... we were also able to measure their intake of nectar which showed that the bees in the degraded landscape were feeding less.*" These impacts may provide insight into stress factors on colonies with ramifications for agricultural pollination services.

## Meant to Bee

A trend for personalised mini-jars of honey as wedding gifts for guests could become a growing market for beekeepers. In classical mythology Cupid, a well known honey thief, tipped his arrows with honey before letting them fly. Now in the age of e-commerce increasing numbers of craft websites are seeing small producers packaging local honey to make that perfect day just a little sweeter.

## Howzat!

Many thanks to the readers who flagged up a one-day international cricket match in Johannesburg between South Africa and Sri Lanka, which was interrupted earlier this year by a swarm of bees invading the pitch. Players dressed in bright pink and blue outfits quickly dropped to the pitch when instructed by the umpire while the bees clustered on the wicket keeper's helmet. Chaos ensued as ground staff tried to move the bees, including failed attempts using a wheelie bin and a fire extinguisher! A restart of the match also failed as the bees stood their ground. A local beekeeper Pierre Hefer watching at home decided that enough was enough and drove to the ground and collected the swarm. The match resumed after about an hour. Sadly, despite South Africa winning Mr. Hefer was not named man of the match!

## Pollinating Drones

Design students and researchers in the US and Japan are looking into methods of providing pollination without bees. Washington State University had been trialling precision electrostatic spray pollination of fruit trees using pollen in a sucrose solution.

In Japan the National Institute of Advanced Industrial Science and Technology has been adding a strip of fuzzy material coated with a gel to the underside of 'off the shelf' robot drones which first collect and then redistribute pollen. Industrial design student, Anna Haldewang, from Savannah College of Art, Georgia, has devised a prototype lightweight drone as part of her 'Plan Bee' project that sucks in pollen for use in cross-pollination.



Photo: Anna Haldewang

## Neonicotinoid Update

The ongoing debate over neonicotinoids has taken a new turn with recent hearings at the General Court of the European Court of Justice in Luxembourg. The cases were initiated by Bayer and Syngenta who are challenging neonicotinoid restrictions implemented in 2013. The EU has also been criticised by environmental groups for allowing emergency neonicotinoid derogations (exemptions) without appropriate challenge. There have also been recent allegations that the European Food Safety Authorities' 2013 draft bee guidance document, which provided information to the EU in the lead up to the ban, may have been subject to bias and conflicts of interest.

In another development, MEPs at the European Parliament have just voted in favour of introducing draft legislation by 2018 to fast-track the evaluation, authorisation and registration of low-risk pesticides to increase the alternatives available to farmers. The decision has received a mixed response with some citing concerns over the effectiveness of alternatives; Julie Girling, Conservative MEP for the West of England commented: "*Sadly this resolution is a product of tunnel vision. It looks only at biological pesticides.*"

# The Apiary in *April*

By Bridget Beattie, NDB

*As the weather and temperature improve this month and we can begin to shed those winter layers, we can get on with doing what we love to do: open our hives and enjoy our bees.*

This month the daylight hours are longer and temperatures are generally rising. Spring is showing her presence in force and it is a welcome relief after the dull, dark days of the last few months. Inside the hive there is rapid development as the queen increases her laying and new bees are emerging from eggs begun earlier at the end of winter. Foragers are able to collect both pollen and nectar from early forage, with buds on trees and plants eager to burst into leaf and flower.

Now we are able to indulge the pleasure of looking at our bees as the weather improves. As soon as temperatures allow us to work in shirt sleeves, we can open hives for the first full inspection of the year. If we have used the winter months wisely, equipment will be clean and ready for use, and the spaces around the hives clear of weeds and obstructions.

## Plan ahead and focus

Before undertaking any beekeeping operation it should be planned beforehand with a clear idea of what we are about to do. I like to make a list of what is needed although then I have to remember to look at it. Of course the first thing we want to do is discover how the bees have fared since we last looked into the brood nest, but it is important to keep focussed on what we are planning to do. Floors should be changed for clean ones and old, dark combs free of brood and stores replaced before the brood nest expands into them, using frames prepared beforehand with either drawn comb or new foundation.

On opening a hive, if all is well, we look for the five elements of any routine inspection: queen present, stores, space, queen cells and health. Their order of importance varies according to the time of the year and the state of the colony. This month, we need to ensure that the queen was not lost over the winter and that the expanding colony does not run out of food.

As long as eggs and worker brood are found we can be reasonably sure that the queen is present and healthy so it is not necessary to spend time looking for her, although at the next inspection, it is a good idea to seek her out and mark her if she is not already in possession of a coloured spot on her thorax. Supersedure often takes place in autumn, which we do not notice and it is then a surprise to find a queen which is not marked. Next we make sure that there is enough honey stored until our next inspection, and if in doubt we should give the colony some light syrup prepared as 1kg white sugar to 1.25 litres of water.

## Ensure space is adequate

At this point in the annual nest cycle there should be plenty of space for the queen to lay and for any nectar from an early flow to be stored. Keep a close eye on space and add supers well before they are needed, not forgetting to add a queen excluder which should have been removed before winter.

If a super of honey was left on the hive, which is what I always do with my Nationals, look back at your notes to see if anti-varroa treatment was used with the super in place. If so, be sure to keep this super with the brood nest until it is empty or until new nectar is brought in, when it should be removed and furnished with new frames and foundation because it is paramount that no treatment gets into honey for human consumption.

## Play cups are normal

There will probably be 'play cups', or embryonic queen cells present, the colony's preparation in case it decides to swarm at a later date; these are perfectly natural and require no action. Only when such a cell is provisioned with royal jelly and an egg or larva does it become a queen cell and this early in the season most colonies are not yet thinking of swarming. Workers build them into the classic thimble-like structure when they are serious about them so we should not panic – yet!

## Check for health and disease

Lastly, but most importantly, the health of the colony should be assessed. Take the opportunity to look for foul brood, especially European foul brood caused by *Melissococcus plutonius* bacteria. With the colony still expanding, the worker bees are not yet sufficiently numerous to be able to clear out any dead larvae as quickly as when the population has grown, so it is easier for the beekeeper to spot any unsealed cells with larvae lying awkwardly with a melted-down appearance. American foul brood (*Paenibacillus larvae*) shows sealed cells with sunken, greasy cappings, and both diseases exhibit a mosaic brood pattern with many cells empty, or laid up out of sequence. If in doubt, ask your area bee inspector to check the hive for you. Look for signs of chalk brood, in fact any brood which looks out of the ordinary. A healthy colony should have good blocks of brood with biscuit-coloured cappings on sealed cells.

Our old friend the varroa mite will still be around so make a routine check by inserting the inspection tray of an open mesh floor, or adding an insert for solid floors. Leave for seven days, count the mite drop and calculate the daily drop, and then use the varroa calculator on the BeeBase website: <http://www.nationalbeeunit.com/public/BeeDiseases/varroaCalculator.cfm>. It is easier to find the mites if the floor debris is scraped into a pot containing methylated spirit and left for ten minutes. The mites will float to the surface and can be strained out for counting.

Having ascertained that all is well in the colony, the floor may be changed for a clean one and the hive left to settle until the next inspection. The old floor is cleaned up and scorched, and then it could be used to replace one in another hive. Colonies can build up rapidly this month if the weather turns warm so from now on inspections must be made regularly to avoid missing a swarm.



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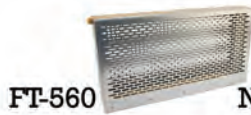
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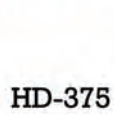
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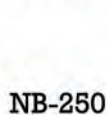
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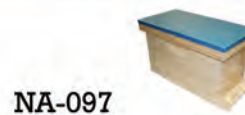
DC-630



NB-250



NA-250



NA-097

# BBKA Highlights: a monthly round-up of plans and progress

## Summer Months and Swarm Calls

Members need to be aware that during the summer months they must use the members' telephone number when contacting the BBKA office; this is 02476 698 620. Traffic on the 0871 numbers advertised on the BBKA website will be severely restricted. This will enable the BBKA office to handle the swarm calls better, while continuing to offer a full service to members.

**Leigh Sidaway, General Manager**

## Feedback on Basic Assessments

**The new swarm control section:** It was interesting to see what effect this extra emphasis on swarm control would have on the results. The overall pass rate was down 1% and the credit rate fell from 68% to 62%. Whether this is normal fluctuation or due to the changes is hard to tell but the lack of major change suggests that candidates upped their game and improved their swarm control knowledge.

**Only one candidate for an assessment:** In this instance the guidelines state that he/she should travel to the assessor whenever possible. Exam Secretaries, please be mindful of health and safety issues, make sure you know the assessor and know that the circumstances are suitable for the candidate in question.

**Val Francis, BBKA Exam Board Secretary**

## Membership for Schools

As part of our Institutional Membership and in response to many requests we are introducing a special membership for schools. The membership and fee will be the same for any school regardless of size, age of pupils or number of pupils. The annual membership fee will be £50. The schools will receive copies of *BBKA News*, a membership certificate and free entry to the Junior Certificate for their pupils. They will also receive free copies of all materials that we produce for schools.

We are hoping that their local associations and branches will welcome them but, of course, we recognise that this may not always be feasible.

The overall aim will be to encourage more young people to take an interest in beekeeping and to establish a network of schools who would support each other and exchange ideas.

**Margaret Murdin, NDB, Trustee**

## 2017 Spring Convention

There are just a few days now until the BBKA's 40th Spring Convention. This year's lineup of speakers includes Jamie Ellis from the University of Florida and Dennis van Engelsdorp from the



Photo: Ian Campbell

University of Maryland. Workshops include traditional skills plus new ones for young beekeepers and an introduction to entomology. And of course, we cannot forget the extensive trade show, so valuable for the extra kit we always need.

**Tim Lovett, Spring Convention Chairman**

## Website

We are making a determined effort to improve the Examinations pages on the BBKA website. Please continue to let me know about any errors or out-of-date information and anything extra you would like to see included. Some new things are:

- Exam techniques.
- Advanced Husbandry guidelines.
- Microscopy guidelines.
- Future Module dates

## E and H Committee

The work of the Education and Husbandry (E&H) committee is growing with ongoing projects like Bees in the Curriculum for teachers, and a new School Visitors Tutor Pack to be designed and developed to help spread the word into receptive primary schools. The Rowse video 'Honey - Liquid Gold' will be on sale at the Spring Convention (SC) and we have revived the second title in this video series, 'Swarming'. If all goes to plan this should also be available at the SC, as will the new release of all four 'Courses in the Case', but with cases replaced by memory sticks. A number of additional trustees, Sue Webster, Margaret Wilson, Jim Divers and Stephen Barnes, have joined E&H with lots of ideas and willing hands. The new *Healthy Hive Guide* is well underway; I know it is in great demand and we are actively working on it.

**Ken Basterfield, NDB, Chair of Education and Husbandry**

## Exam Board

At the 2017 ADM in January, delegates appointed three members to the Exam Board. We welcome new members Fiona Eelbeck and Christopher Evans and our current Chair, Pam Hunter, who was re-elected. These members will join our Exam Secretary, Val Francis and the other Exam Board members who tirelessly set, mark and moderate all of the exams.

**Margaret Murdin, NDB, Trustee**

## BBKA News

Last year we asked how you would prefer to receive your copy of *BBKA News*. Not that many responded but of those who did, the majority wanted to continue with a paper copy. Recognising that some people would prefer an online copy we are investigating an online version that would also be easy to search. Those who want to read back issues of *BBKA News* online now can do so by logging in and going to the News and Events area of the BBKA website.

**Margaret Wilson, Trustee**

Coming soon:

- Procedure manual.
- Modules 1-8 syllabii in one document.
- Revised exam framework diagram.
- Module result dates.
- Another sample mark scheme, this time for module 1.

**Mark Oakley, BBKA Webmaster**  
[mark.oakley@bbka.org.uk](mailto:mark.oakley@bbka.org.uk)

## Volunteers Needed to Help with the BBKA Website

This exists to educate and inform everyone about beekeeping and the BBKA. We need to keep it fresh and current, but to do that we need volunteers to undertake editing activity. So if you have the appropriate IT skills and would like to help, please contact [david.teasdale@bbka.org.uk](mailto:david.teasdale@bbka.org.uk)

**David Teasdale, Trustee**

## Module Examination Papers

In the interests of running the Examinations as cost-effectively as possible the Module papers are now available to purchase for £1 each, from the BBKA online shop: [pollen.basket@bbka.org.uk](mailto:pollen.basket@bbka.org.uk).

**Val Francis, Exam Board Secretary**

# Fundraising News

By George Brown, BBKA Income Generation Manager



## A refreshed approach to our fundraising

Adopt a Beehive has been running now since 2010 and has generated £670,000 of income to date. However, in recent years costs associated with a premier product of this nature have risen. We have, therefore, been busy re-costing the scheme and we are now working towards a net return per Adopt a Beehive pack sold of £22 per donor. This is compliant with guidelines set out by the Institute of Fundraising. So, if we could sell 1,000 the return to BBKA would be £22,000. We will be using part of the £22 to comply with our charitable objectives which is to engage, educate and inform the general public about beekeeping, the challenges facing honey bees and the much wider issues surrounding the habitats and environments essential for our bees to thrive in.

As part of this project we have secured further support and sponsorship of £10,000 from Burt's Bees, which has enabled us to refresh our Adopt a Beehive 'brand' and to merge it with our other income-generating project, Friends of the Honey Bee, into a much more integrated approach to fundraising and engaging with the public. This money will allow us to provide every local association with information about the schemes so that you can support them and your own local association at the same time.

Our Friends of the Honey Bee campaign has had great success in terms of corporate partnerships and we hope to develop this further using a new Friends of the Honey Bee Facebook page to complement our existing Instagram page. This will further support our relationships with Joules, a high street 'fashion' retailer, Eat Natural, Burt's Bees, Belvoir, Just Bee Drinks and our other donors who support us.

We are also planning to use the Friends' of the Honey Bee campaign to launch our education in schools and I am actively seeking funding to make this a reality over the coming years. So, if you know of any potential sponsors then please let me know and let us work together to get the project on the Department of Education's school agenda!

## IMYB

Fundraising through our Just Giving page 'ourfutureinyoung people' continues to gently grow and we have raised £1,200 to date. Thank you everyone who has donated through this page to support our International Meeting of Young Beekeepers, which will be held in July this year. As I mentioned in earlier issues of *BBKA News*, this is an extremely important event for us as it will create a template from which we will be able to develop further

strategies to engage with young people and encourage them to take up beekeeping. So, please help us spread the word, either through work, school or any organisation you may be part of. Any donation through this site, no matter how small, is valuable to us and, if you are a UK tax payer, we can claim an additional 25% in Gift Aid on every £1 donated, which is great news.

I will be at the Spring Convention and would love to meet you to talk more about plans for the future. Thank you all for your support.

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# The Management and Prevention of Swarms

By Dinah Sweet, MSc, MB, Dip. Apiculture (Cardiff University)

*The 'swarming months' will soon be upon us and to help us prepare Dinah Sweet explains how to identify potential swarm triggers and how to respond appropriately.*



Swarms can arrive in the most unexpected places. All photos are by Dinah Sweet.

You will see plenty of information on 'swarm control' in books and magazine articles, but I do not believe that even the most skilled beekeeper can always control a colony of bees. We just try our best to manage the bees' natural instinct to increase themselves by swarming. There are many reasons to prevent our colonies from swarming, the main one being that we do not want to lose our best queen. We do not want to frighten our neighbours or the public by allowing our colony of bees to swarm. We also do not want to diminish the amount of honey collected or let the bees deplete themselves so much by swarming that they are too weak to survive the following winter.

## Why swarming can happen

Swarming is a frequent occurrence in most races of *Apis mellifera* and the factors that predispose a colony to behave in this way are many, some of which can be managed. One trigger for swarming is congestion in the colony; either too many bees are crowded in the brood chamber with not enough space for the queen to lay, or there is not enough room for the bees to unload pollen and nectar.

An old queen producing low amounts of queen pheromone or a damaged queen with poor quality queen substance may also cause a colony to prepare swarm or supersedure cells in order to replace her. It can be difficult to tell the difference between these two types of cell, but supersedure is when a colony produces a new queen without swarming. It is said that supersedure cells are few and tend to be placed in the centre of a brood frame whereas swarm cells are more numerous and are found along the side or bottom bar of brood frames. They look so similar that

you cannot tell them apart and both are vertical elongations of queen cups with an egg or larva inside. They are easily missed as bees often totally cover them up or they may be hidden in a crack between the wax and side bar of a frame. Beekeepers often panic when they see queen cups but until they are loaded with a larva floating in royal jelly, nothing needs to be done.

The third type of queen cell is an emergency cell, produced at the sudden loss of the queen and not built in response to the swarming impulse. Emergency queen cells look different as they are made from converted worker cells that already contain a very young larva, being part horizontal and part vertical, looking like a broken nose from the side. When these are present the colony will not swarm but it will allow only one queen to survive.

It is important not to panic when you see a queen cell; being able to recognise the different cell types will make this easier for you. Whatever type they are, stop and plan what to do next and on no account destroy them as it will only frustrate a swarming colony and render a colony with no queen totally queenless, with no eggs or larvae of the correct age to turn into a queen.

You can help mitigate swarming by following good beekeeping practice, such as:

- Adding drawn comb to the brood chamber when needed.
- Replacing old and mouldy frames.
- Timely addition of supers just as a honey flow has started, because this may also delay swarming.

A few beekeepers say that not using a queen excluder, especially with Carniolan bees, prevents swarming. However, even



A swarm in low-growing vegetation is more accessible for collecting than if high up in a tree.

with a young queen heading a colony, it may still decide to swarm especially if the weather confines the bees to the hive for a few days or if the forage stops suddenly.

### Signs that a colony is preparing to swarm

There are few signs that a colony is preparing to swarm as even the odd egg in a queen cup may not lead to anything and be eaten by the worker police bees. Knowing local conditions and seeing the bees progressively expand in number will give the beekeeper an idea of when to start weekly inspections. These can be extended to ten-day inspections if the queen is clipped, but it will not prevent swarming. The appearance of drones in the colony also indicates peak build-up and so the beekeeper may do a pre-emptive split early in the year to prevent swarming. However, this may only delay them and they still may decide to swarm!

The queen is starved for a short while before a swarm emerges from its hive, as she needs to be light enough to fly with the prime (initial) swarm, but this makes her a lot more difficult to find. She leaves the hive with anywhere between 20% to 60% of the bees, usually as soon as the first queen cell is sealed, so the beekeeper must inspect regularly even if it is cold or raining. This must be done quickly without chilling the unsealed brood and will become a smooth operation with experience.

### Measures to help prevent swarming

Many books advocate cutting out queen cells at first, but this only frustrates the colony and the bees will soon produce more cells from older larvae. The old queen may have already gone with the swarm that you have missed, although the colony may seem to have just as many bees in the hive as before, leaving an inferior queen or no queen at all. It is really important to have collected or made plenty of spare equipment early on in the year and work with the bees, so as soon as queen cells are seen, you do not go into panic mode but have a sensible plan of what to do next.

### What to do when swarm cells are found

By engaging with the bees and using their swarming impulse as a positive factor, an artificial swarm method can be put into action when unsealed 'swarm' queen cells are found. If the queen cells are already capped, there are no eggs and the queen cannot be found, it is probably too late. However, she may still be around and if marked, she is much easier to spot. It is always a good idea to have a nucleus box on hand when doing an inspection so that if you do find the queen, put her with the frame she is on, in the nucleus for safe keeping. It is now that you need spare equipment and the excuse that you have not managed to put anything together yet will not do as the bees cannot wait.

The old hive with the majority of bees, brood and queen cells should be placed about five feet from the original site, with the entrance at right angles to its original position and it should be made smaller. A new hive comprising a floor and brood chamber with frames mostly of foundation, should be placed on the original site. The frame with the queen on in your nucleus box can now be moved to the middle of the new brood chamber and if there are any swarm cells on it, these should be removed. Perhaps put another drawn frame next to this containing some pollen and honey just in case the weather is poor for a few days. A queen excluder and old supers plus new supers (when needed) can then be put above this new hive. Flying bees will join the old queen in the new boxes on the original site and as there is very little brood here, the colony will resemble a swarm. As there is plenty of room in the new hive, queen pheromone will spread around quickly and the colony is unlikely to swarm again that year. At first the bees will soon pull out the foundation and put honey in the supers, but as the queen gets down to laying again the normal division of labour will continue.

### Ensure varroa is controlled in the original hive

As most of the brood is in the old hive on the new site, if this has a varroa problem, then it could be treated with a miticide, such as Apiguard or MAQS. You must follow the instructions carefully on each medicine packet. There will be no honey present to contaminate with the treatment.

The old colony containing queen cells may still decide to swarm if it is too strong. If this is the case it could be split into two, making sure each part is a viable unit and contains at least one queen cell. They may also need feeding as most of the foragers will have returned to the new hive on the old site. That is why it is best to wait a few days before feeding as some of the bees flying back to the original site may tell the others and 'silent' robbing may take place. It will take up to four weeks for the new queen to mate and start laying. Allow only a quick look inside to check that the queen cell has hatched but otherwise do not disturb it. If you want to return to just one colony later in the season, then you can remove the old queen and unite the two through newspaper, keeping the queen-right colony on the bottom. A week later rearrange the frames or overwinter the colony on a double brood.

*“By engaging with the bees and using their swarming impulse ... an artificial swarm method can be put into action when unsealed ‘swarm’ queen cells are found.”*

I have found this artificial swarm method, often called the Pagden method, using separate hives, to be the simplest and most successful. If the new colony tries to swarm again the procedure

can be repeated. There are many adaptations to this where the part with the swarm cells is placed above the new hive on a floor with the entrance facing a different way, e.g., Demaree method, Snelgrove method. Although these methods save on some equipment, I have witnessed many problems with them, from overheating in the top box to starvation of the bees in the lower box. They are often too complicated for beginners and the beekeeper is confused as to what is happening in each box.

It may be that however frequently you inspect your bees, queen cells are not recognised or hidden by the bees and you see a swarm departing over the hedge. You can still prevent cast swarms by going through the colony carefully and leaving just one open queen cell, removing all others using a bee brush to check in those awkward places. A bait hive in the apiary, containing frames with at least one old but clean frame that really smells strongly of beeswax, may also lure a swarm to settle down, if regular inspections are difficult. For more information about bait hives turn to page 125 in this issue where Bridget Beattie describes these in detail. When I first started beekeeping I followed advice from old books and tried banging a dustbin lid to get a swarm to settle. This really did not work! A hose held over the swarm making them soggy but not too wet will be more effective.

May and June are the months of the year that a colony is most likely to swarm, so avoid going off on holiday then, have plenty of spare equipment ready, keep your hive records up-to-date so you know the age of each queen heading a colony and make sure your queen is marked so that she is easy to find. A swarm can happen at any time from April to September, but regular inspections should help you to 'read the hive' and come up with the best action plan.

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# The 'Grab Them and Run' Swarm Collectors: What Not To Do

By David Teasdale, BBKA Trustee

Last year, there were many reports and complaints from members of the public in response to contacting a beekeeper for help to deal with a genuine swarm of honey bees in their gardens. One example could have made a script from an Ealing comedy had it not been so serious. The beekeepers arrived, collected the swarm and left within half an hour. However, within minutes of the beekeepers departing, hundreds of honey bees appeared back at the original site. The beekeepers were contacted again. They said that they could not come back but that the bees would go back home within a short time. As you would expect this did not happen, so it left the householder with a worse problem than before. I call this type of swarm collector 'a grab them and run' collector. Rather than providing a public service, they were a disservice to the public and the whole beekeeping fraternity. This is 'what not to do'.

## Swarm basics

When a swarm departs the home hive, it settles (clusters) away from the hive on anything from a branch of a tree, a shrub, a gatepost or anything that the bees can form around. When the swarm has clustered and settled, several hundreds of scout bees leave the cluster and fly off in all directions to find a new suitable 'home' and then return to the main cluster to induce the cluster to move to the proposed new home. Although the waiting swarm cluster could be collected and removed you must wait for all of the scout bees to return; simply collecting part of a swarm is very bad practice and merely results in the situation described above. This emphasises the importance of allowing sufficient time to safely complete the task; although it might (occasionally) be completed in a relatively short time, it can (and generally does) take up to several hours to do it correctly, so do not rush it.

## Swarm collecting training

Collecting honey bee swarms is not a task for new beekeepers nor for the feint-hearted. Each swarm is different and each one presents its own challenges, which must be addressed safely and overcome. All associations provide some training and 'buddy' support for those beekeepers willing to collect swarms. This will address pitfalls which can affect the beekeeper, however experienced. Normally it will also encompass all aspects of collecting swarms including what you can, cannot and should do to complete the task, but the most important aspect is safety. So before you attempt to deal with a swarm, assess the risks, work out what you are going to do and how you are going to ensure that everyone and everything in the vicinity is safe and not placed at any risk; that includes the beekeeper.

Swarm collectors should:

- Ensure everyone and everything is safe and that appropriate warnings have been given.
- Work out how to remove the swarm and clear any obstructions



A swarm settled in a tree by Helen Knight, Worcestershire BKA.

- which might make that difficult to achieve; be sure to gain the householders' permission before taking secateurs to anything to ensure that you do not trim a prize-winning, valuable shrub.
- Place a sheet on the ground near to where the swarm is located.
- Collect the swarm or the bulk of the swarm into a container and do not worry if you do not collect all of the bees as the flying bees will return to the box.
- Place the container, upturned, on the ground away from the direct heat of the sun (if possible) on top of the sheet. Ensure that there is a gap between the sheet and the container, which allows returning bees or other flying bees to return to the cluster.
- If safe to do so, leave the container until dusk when all of the flying/scout bees will have returned and then wrap the container in the sheet and ensure that it is secure before removing it from the site.
- If it is unsafe to leave the container, all you can do or should do is sit and wait until all of the bees have returned.

Sadly, it is not always possible to ensure that all bees from a swarm have been collected, but given sufficient time you should be successful. All you can do is your best but nothing can be guaranteed when you are dealing with wildlife.

## Insurance

Your BBKA insurance provides you with protection providing that you act safely and that you do not undertake swarm collection for gain. Although it is acceptable to request reasonable expenses for travelling etc., it is against the terms of the BBKA insurance for beekeepers to sell swarms that have been collected or charge commercial rates for collecting swarms. So be warned.

In concluding, collecting swarms can be enjoyable and rewarding in many ways providing that it is undertaken safely, but do not forget that the bees do not read the same books as us!

# Certificate in Honey Bee Health

By Pam Hunter, Master Beekeeper, Chair of the Examination Board

*A new BBKA assessment, which will follow on from the Basic Assessment, for small-scale beekeepers, is described by Pam Hunter.*

Currently, after taking the Basic Assessment, the next assessment a beekeeper can take is the General Husbandry. This, however, is not suitable for small-scale beekeepers, of which, it is thought, there are many. The minimum requirement for the General Husbandry is three honey producing colonies and a nucleus at the time of the assessment, but to comply with this most people ensure that they have at least five colonies. In addition, the assessment takes place in the candidate's own apiary and their honey extracting and bottling facilities are examined. Some potential candidates find this too daunting.

The Examinations Board has been aware for some time that we are not serving the very large number of beekeepers who only have one or two colonies, often in their garden or a friend's garden. Many of these members have no desire to increase the number of their colonies, being quite content to remain small-scale. They may also not get much honey and are happy with just a few jars for friends and families. The General Husbandry is thus quite unsuitable and inappropriate for these beekeepers.

With this in mind, we have developed a new assessment specifically designed for such members; candidates taking this assessment, if successful, will obtain a Certificate in Honey Bee Health. Unlike the General Husbandry, this assessment will not take place in the beekeepers' own apiary but in a branch or association apiary, like the Basic Assessment. The apiary will provide the colonies for the candidate to use. It is designed to test the candidates' handling ability and their ability to recognise healthy colonies.

The assessment will take place usually in May, June or July and will emphasize handling skills, health and hygiene. The structure will be similar to the Basic Assessment in that there will be various practical tasks to perform, including a disease inspection, and a short session of questions and answers based around health, hygiene and nutrition. Other practical tasks might include, for example, a shook swarm, a Bailey comb change for a colony shown to have nosema, using a lateral flow device or drone culling. It is anticipated that the assessment will last approximately an hour and a half; this is slightly longer than the Basic Assessment but shorter than the General Husbandry, which is approximately three hours.

Some candidates with more hives might find this assessment a useful stepping stone to the General Husbandry, as it may give them more confidence, but it is not the intention to make this a mandatory step prior to taking the General Husbandry.

Candidates will be members of the BBKA and will have obtained their Basic Assessment certificate at least two years earlier. Like other practical assessments, the result will be a simple pass or fail, with no grades.

It is intended that some trials will be run in the summer of 2017 with volunteer candidates and, if successful, the new assessment will be launched in 2018. We intend to have the draft syllabus available at the Spring Convention and we hope that branches and associations can then start training candidates during this year ready for them to take the assessment in 2018.

There will be a presentation at the Spring Convention explaining this new assessment in more detail.



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# IMYB

By Ian Homer, BBKA Trustee

It is that time of year again when we book our tickets for the Spring Convention. Obviously you will be looking at the range of lectures and workshops and, for the second year running, there is a workshop for the International Meeting of Young Beekeepers (IMYB) and young beekeepers as a precursor to future selection days. This is designed for young beekeepers and their parents to meet with participants of previous IMYB competitions to learn first-hand what is expected of a team member. Some of the competition exercises will be explained as well as the protocols of visiting other countries. There will be plenty of time for questions to relieve any anxieties. The workshop is free of charge and welcomes any young beekeeper, up to the age of 15, who might be interested in becoming a part of Team England. For 2018 the participants will have to be no older than 16 on 1 January 2018. Come and see what is involved. For safeguarding purposes, young people must be accompanied by a parent or guardian. All those interested please book a place with Ian Homer, by email, at [ian.homer@bbka.org.uk](mailto:ian.homer@bbka.org.uk). The IMYB stand will be found in the Regional Food Academy for anyone to discover more about this truly international event.

Many of the previous participants have described their experience at IMYB as one of the best of their lives. Selection day for the England IMYB team for 2017 was on 5 March and, having now been selected, and we can introduce the team members to readers. Firstly, we have Younis Bashir from Acocks Green in Birmingham. Younis was a member of the English team in Prague in 2016 and is delighted to be making a return to the team in 2017. His experience will be invaluable in helping new members of the team find their feet. Next on the team is Sarah Bush who was in the English team for the visit to Slovakia in 2015. Sarah put together an



(left to right) Luke Charnock, Manchester, (team reserve), May Smith, Romsey, Hants, Serena Watts (Team Manager), Sarah Bush, North London and Younis Bashir, Birmingham.

exhibit for the National Honey Show later that year based on her observations and experiences in Slovakia, which was awarded first place in the class. In the two years since her last experience, Sarah has put a lot of work into her practical handling and is looking forward to Marlborough. May Smith from Romsey in Hants is the third member and a complete newcomer to the team. During the selection day activities, May quickly showed how much she had learned from her tutor in a relatively short time. May was quite overwhelmed by her

selection and has promised that we will not be disappointed.

We always expect everything to go well in the run-up to IMYB but, to be on the safe side, we also selected a reserve. Luke Charnock is a very new beekeeper, but he demonstrated a sound knowledge of beekeeping together with good team-working skills. He will be 'on the bench' for 2017, will work with the other team members throughout their preparation for the event and will still be young enough to compete for a place in 2018.

One of the candidates for a place this year was Rebecca Mundy who has become a stalwart in the team over the last three years. Rebecca was not selected for the team this year as all agreed that she would make an excellent facilitator; a sort of team mentor for one of the multinational teams at IMYB 2017. Rebecca was delighted with her selection as it marks a new phase of IMYB involvement for her.

Those candidates who were not selected should not feel downhearted as the selectors found the task very difficult because of the overall high standards. Fortunately, youth is on their side and with another year of experience they will make the task of the selectors even more difficult next year.

## A Message from Lord Stern

In recent years, we have all become increasingly aware of the role of insect pollination in sustaining our food supplies and, in particular, the importance of honey bees, which can be managed and supported when environmental elements conspire against wild pollinators. Honey bees are highly dependent on beekeepers to ensure their well-being and to ensure they survive when challenged by lack of forage, pests and diseases, and negative environmental factors such as bad weather.

It is vital then that we encourage people to take up beekeeping and, in particular, we encourage youngsters into this important and fascinating craft. I am thus delighted to support the British Beekeepers' Association and its innovative approach to working with and inspiring a new generation of beekeepers.

In July of 2017, the International Meeting of Young Beekeepers will take place over three days at Marlborough College, Wiltshire. It will provide a great opportunity for young people from countries all over the world to share and learn from each other the essential skills needed to further the craft of beekeeping. It is imperative that we work hard to encourage more young people to engage in and really understand both the environmental and the economic importance of this craft. Honey bees have suffered declines for a variety of reasons. This flagship event will focus on the scientific and technical knowledge needed to create a sustainable future for our honey bees and for the habitat they need to thrive in.

It is not just about the bees though! This meeting is also about young people coming together and exploring each

others' attitudes to culture, collaborative thinking, problem solving, laying the foundations for life-long friendships and having a great deal of fun too!

2017 will be the first time this international event has taken place in the United Kingdom and will provide an opportunity for the British Beekeepers' Association to play a major role in promoting beekeeping to young people at home and abroad.

I wish the event every success and to the teams from all over the world – good luck over the three days of friendly competition, learning and interaction.

**Lord Stern of Brentford**  
**President of the British Academy**  
**IG Patel Professor of Economics and**  
**Government at the London School of**  
**Economics and Political Science**

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# BBKA Research Fund: Projects funded since 2009

Dr David Aston, BBKA Past President.

*The question often asked is 'what kind of work does the BBKA Research Fund support and what has it achieved in recent years?' This short report lists the research projects supported by contributions from the BBKA Research Fund to date. The funds available to the BBKA Research Fund come from a variety of sources including: Adopt a Beehive, Friends of the Honeybee and donations from Member Associations and members of the public. Monies are usually given with the wish that they be used to carry out honey bee research.*

### How it works

Applicants are invited to apply to the fund for financial support. These applications are examined by the Technical and Environmental Committee members, who make a recommendation to the BBKA Trustees on whether the application is supported or not. Generally, the funding is used to support those research projects whose results will have some beneficial effect on the health of the honey bee. The application process can be completed quite quickly and there are no deadline dates to be met because applications are considered as they arrive in the office. This is our current operational procedure, although it may change in the future.

### Awards and research areas funded

The main part of this article gives a brief description of the awards made and the subject of research to which the funds were used. The name alongside the award does not necessarily mean that this person carried out the work, but this was the person who was responsible for seeking the funds to which the BBKA Research Fund contributed.

### Ron Hoskins Swindon BKA (2009–2010)

Hygienic bees; assistance on the scale-up of selecting and preparing hygienic bees which help honey bee colonies control varroa mite population numbers. £6,000.

Ron's work has been reported on several occasions to beekeeping associations and the media. His material has also been studied in other projects reported below.

### Prof Frances Ratnieks LASI University of Sussex (2011–2013)

Hygienic bee project, which forms part of the Sussex Plan for honey bee health and well-being. £36,000.

The funds were spent supporting the PhD Studentship of Gianluigi Bigio who obtained his PhD in July 2014. Gianluigi's thesis, titled *Hygienic Behaviour in Honey Bees*, can be read on [sro.sussex.ac.uk/51384/1/Bigio%2C\\_Gianluigi.pdf](http://sro.sussex.ac.uk/51384/1/Bigio%2C_Gianluigi.pdf)

A list of publications arising from the thesis research is included in Gianluigi's thesis as well as on the LASI website. Reports on the work can also be found in the BBKA *British Bee Journal (BBJ)* in 2014 and in *BeeCraft* July 2014. A full publication list of LASI research can be found on the LASI website, [www.sussex.ac.uk/lasi](http://www.sussex.ac.uk/lasi)

*Dr Falko Drijhout  
Keele University (2011–2014)*

Pesticides in honey bee colonies. £17,600.

The funds were expended supporting the PhD studentship of Kris Wisniewski who has obtained his PhD. His thesis title is *A survey of the levels of pesticides in bees, their colonies and forage*.

*Dr Falko Drijhout  
Keele University (2011–2014)*

Identification of pollen phagostimulants and the development of improved pollen supplements. £17,600.

The funds were expended supporting the PhD studentship of Richard Bridgett who also obtained his PhD. Richard's thesis title is *The application of chromatographic techniques and behavioural bioassays towards isolating and characterising honey bee phagostimulants*.

*Prof Keith Delaplane (Summer 2013)*

Instrumental insemination, an aid for extreme polyandry in honey bee queens. The funds were to support a summer visit by Keith to the UK, working at the NBU at Sand Hutton. £2,225.

Keith's work demonstrated in the field that high polyandry (mating of a virgin queen with drones from different colonies) is associated with colony health and performance. The effect was exaggerated using artificial insemination techniques and genetic material selection.

*Dr Huw Evans, Arnia (2012)*

Hive monitoring to quantify colony disturbance and settling down times following different hive inspection regimes. In co-operation with Wisborough Green BKA. £5,600.

A summary of the work done can be found in the *BBJ* in September 2015 and posters and presentations have also been made at the Spring Convention and elsewhere.

*Dr Declan Schroeder  
Marine Biological Association and University of Reading (2013-2015)*

Receptor binding and host cell entry by Deformed Wing Virus, an emerging agent of honey bee decline, £18,000.

The funds were expended supporting the PhD studentship of Gideon Mordecai. One of his publications can be found in the September 2015 issue of the *BBJ*. The work involved the implications of RNA virus quasi-species: determining the cellular and tissue tropism of Deformed Wing Virus. His thesis title is *Diversity in Emerging Honey Bee viruses*. He has published the following three papers and there is fourth in press.

Mordecai GJ, Wilfert L, Martin SJ, Ian M Jones IM, Schroeder DC. Diversity in a honey bee pathogen: first report of a third master variant of the Deformed Wing Virus quasispecies. *The ISME Journal* 2016; 10:1264–1273; doi:10.1038/ismej.2015.178; published online

17 November 2015.

Mordecai GJ, Brettell LE, Martin SJ, Dixon D, Jones IM, Schroeder DC. Superinfection exclusion and the long-term survival of honey bees in *Varroa*-infested colonies. *ISME J* 2016; 10(5):1182–91. doi: 10.1038/ismej.2015.186 PMID: 26505829.

Mordecai GJ, Brettell LE, Pachori P, Villalobos EM, Martin SJ, Jones IM, Schroeder DC. Moku virus; a new *Iflavirus* found in wasps, honey bees and *Varroa*. *Scientific Reports* 2016; 6: Article number: 34983; doi:10.1038/srep34983. Published online: 07 October 2016.

*Prof Stephen Martin  
University of Salford (2014-2017)*

Deformed Wing Virus – its contribution to overwinter colony losses. Investigating changing strains within the UK and the quasi-species theory and the cloud of closely related strains. £13,200.

A further award of £3,000 was made to contribute to the purchase of special equipment needed to conduct the research.

The funds are being used supporting the work PhD of Laura Brettell. Her work will lead to an understanding of the contribution that Deformed Wing Virus (DWV) makes towards the overwintering survival/ losses of honey bee colonies. She is also studying the cloud of closely related strains of these virus as these seem to demonstrate differing degrees of pathogenicity.

Laura has reported on her work in August and November 2014 issues of *BBKA News* and there is a further report accompanying this article.

*Dr Declan Schroeder  
Marine Biological Association (2015)*

The establishment of a honey bee cell line; a mechanistic cell line facility is being developed towards gaining a mechanistic understanding of viral infection in honey bees. £24,853.

The facilities, called The Hive, were ready in October 2016 and following training of new staff will become operational soon.

**Conclusion**

To date the BBKA Research Fund has disbursed some £140,808 of funds. The BBKA and beekeepers wish to express their heartfelt thanks to all who have supported the BBKA Research Fund in being able to help fund research and its application to beekeeping practices and knowledge. This funding will help safeguard the future of the honey bee so that the environment (including man's dependence on pollinators for food diversity) continues to function and produce and sustain biodiversity in all its forms. ■

# DWV in Brazilian Africanised Bees

By Laura Brettell, University of Salford

*Deformed Wing Virus (DWV) is carried by the Varroa mite and exists in three known variants or 'types': A, B and a more recently isolated type C. Previous research has led us to believe that DWV Type A is the most lethal variant, and we have also recently found that DWV type B is associated with improved colony survival through super-infection exclusion. Although populations of honey bees have long been established on the Hawaiian archipelago, it is only relatively recently that in some of the islands Varroa mite infestations have been reported and with it DWV type A has emerged. This provided us with a golden opportunity to study changes in the strain types and amounts of honey bee viruses in a previously uninfected honey bee population and has been part of my PhD research.*



*Above: Laura Brettell and colleagues at work in the apiary in Hawaii. All photos courtesy of Laura Brettell.*

We discovered that deformed wing virus (DWV) type B (originally known as *Varroa destructor* virus 1) dominated in these bees and was able to prevent DWV type A from becoming established. This is important because we know that DWV type A has been the cause of large scale losses in Hawaii and other parts of the world. Naturally, this raises the question of whether inoculating with DWV type B could be used in the future as a preventative treatment. Of course it is rarely as simple as we would hope, but future work will definitely be done to explore this possibility.

During this trip I collected bees from colonies maintained on one of the world's most exclusive golf courses, built in the middle of a barren lava field. Constant irrigation allows some decorative plants and trees to survive and these allow a number of bee colonies to survive in this most barren of landscapes.

Last winter started the beginning of the third year of my PhD and I am now starting to feel the pressure of having to produce a thesis during this year. I have, however, been fortunate enough to have just had my second research trip to Hawaii in a year. I am feeling the cold now, but I am back! The first trip I made to Hawaii was in April when I was invited to speak at the 100th annual meeting of the Pacific branch of the Entomological Society of America. There I spoke about some recent research that had been carried out by our team in Salford with our collaborators at the MBA in Plymouth and which had been part-funded by the BBKA Research Fund. We found that due to a mechanism known as 'superinfection exclusion' a population of bees in Swindon were surviving despite a thriving *Varroa* population and no treatments.



*Above: Laura Brettell ready for research in the apiary in Hawaii.*



Above: A view of Kauai apiary in Hawaii.

I have also been speaking to BBKA members on the topic of superinfection exclusion during the past year, both at the National Honey Show last year in Weybridge and to Derbyshire BKA around the same time. One aspect that I particularly value and enjoy at these talks is having the chance to chat to everyone afterwards and hear perspectives from 'real beekeepers' rather than my own bee scientist angle!

My most recent trip to Hawaii came about because I was invited to the annual meeting of the Western Apicultural Society, to give two talks to a group of beekeepers and bee scientists from across the Americas. The talks included information on an array of bee diseases, pests and pathogens which attack our bees or may potentially be on the horizon, as well as some of my own research. I discussed some recent work I am currently putting together for publication looking at a rare population of European honey bees in Brazil, which survive quite happily with *Varroa* despite never being treated. This research was again made possible by contributions from the BBKA Research Fund, for which I am very grateful. We had originally looked to this population to try to learn from them how we might be able to protect our bees across the world which have been suffering with *Varroa* infestations for many years. Sadly, as interesting as it is, this population did not provide the silver bullet that I and many beekeepers seek. It was great to

spend time at the conference and speak to people who work with bees in other parts of the world. We had some productive discussions about threats to our bees back home and to tropical bees, as well as about the practicalities of working with Africanised bees.

But back home now things are really ramping up in the lab. Like you will have been I am sure, I have been following the worrying reports of Asian hornets arriving in the UK. I am especially concerned with this particular pest because of a research interest I have in emerging infectious diseases. We have recently published some research on Moku virus, a new virus we discovered in yellowjacket wasps from Hawaii. Worryingly, we also detected Moku virus in honey bees and *Varroa* from the same island.

Although we do not yet know if the Moku virus causes any negative effects or symptoms in bees, we do know that these kinds of viruses evolve quickly and just because they are not a problem now it does not mean that this will be the case into the future. This situation is much like that of deformed wing virus; for a long time DWV was not much of a problem, then an ecological factor changed, in that case it was the introduction of *Varroa* to European honey bees and it became much more of a significant threat.

It is this interplay between diseases that have the ability to infect bees and ecological factors, such as the movement of other insects that share their communities and which may harbour their own suite of viruses, that I find fascinating and potentially very important. I will, therefore, be spending the majority of my final PhD year investigating other insects which live among honey bees to try to discover if they are important factors in viral spread or if they may harbour the next big threat to bees. After all, as we know, trying to anticipate threats before they happen is definitely preferable to trying to recover after it is too late. ■



Above: Examining frames in Hawaii.

# Bait Hives

By Bridget Beattie, NDB

*Using a bait hive can allow us to collect a swarm that has issued from one of our colonies, and can allow us to increase our colony stocks into prepared equipment. Bridget Beattie discusses the practicalities and advantages of using bait hives.*

Swarming and its control are major challenges for beekeepers as time and vigilance are not always available at the right moment. Beekeepers who have several colonies at their disposal can more easily make up losses or make increase than those with only a couple of hives. Splitting, making up nuclei and performing artificial swarms do not affect honey production as much for the professional beekeeper as they do for the hobbyist. Bait hives rely on attracting swarms into prepared equipment. For little outlay, this is a useful way for small-scale beekeepers to increase their colonies or perhaps recover a swarm from a colony. The use of artificial Nasonov pheromone lures are said to result in 50% to 80% occupancy providing certain principles are observed.

## Honey bee reproduction

Before describing how to proceed, we will examine the biology underlying the technique. Two forms of reproduction are at work in honey bee colonies: that of the individual bees, and that of the whole colony. Frequently we hear the colony referred to as a 'superorganism' and when a colony swarms it is the superorganism that reproduces itself.

Swarming is a natural process. When in spring and summer a colony becomes congested in its space, the instinct to split is often evoked as a result of dilution of the level of the queen's pheromones throughout the colony. These chemical messages are spread by workers who pick them up from the queen and then distribute them to other workers by trophallaxis, or food sharing. Drones will have already been raised in preparation for mating with virgin queens, and scout bees now start looking for a suitable 'des res'.

Part of the original colony, estimated to be between 30% and 70%, leaves the hive with its queen and takes up residence elsewhere. The size of a swarm is variable, from two thousand to fifty thousand bees. The smallest swarms are likely to be secondary casts which have left with an emerging virgin queen, while the largest are probably two swarms which somehow became confused and joined forces. The majority of a swarm is comprised of workers, a high proportion of which are wax builders so that a new nest may be constructed quickly, but a few drones may be included. Until the queen can begin to lay again and as the older worker bees die, there will be an immediate decline in the swarm population. It is, therefore, essential that the new colony establishes itself and stores sufficient food in plenty of time before winter.

## Signs of swarming behaviour

In the main swarming season of spring to mid-summer, the spectacle of a colony issuing a swarm lasts perhaps ten minutes. Usually the bees form a cluster nearby for a few hours or up to a few days before taking off again for the chosen new home. However, preparations will have been underway several days before. Workers reduce the food intake of the queen so that she loses up to thirty percent of her body weight to prepare her to fly and queen cells are constructed and stocked with royal jelly in which the queen lays fertilised eggs. When these develop into larvae they are fed differentially to promote their development into queens. One of these will take over the colony after the swarm leaves.



A swarm cluster in a tree. All photos are by Bridget Beattie.

Scout bees will be out inspecting cavities in trees, stored beekeeping equipment and sometimes our house and shed roofs. They are appraising potential new nest sites and will dance on the emerged cluster's surface to recruit other bees to their choice. When a consensus is reached the swarm moves off to the agreed site. So, when we find large numbers of bees investigating stored boxes, attracted by the odour left by former occupants, it is a sure sign that somewhere, a colony is about to swarm. Indeed, a swarm may well decide to occupy our empty boxes. The colony left behind is a reduced unit, which, in time, rears a new queen and resumes its normal activities. Voila! There are now two colonies where before there was one.

### Bait hives

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and place bait hives to their advantage. Observation of the selection of new nest sites and the development of new colonies gives us some insight into what the bees are doing.

Professors Tom Seeley and Roger Morse, and researcher, Richard Nowogrodski, at Cornell University, studied sites that were selected naturally and this research enables us to choose the best places to locate bait hives. Their results indicate that bees prefer a shaded site, around four metres above the ground, with a cavity of any shape and a volume of about forty litres, which is approximately the volume of a standard Langstroth brood body. A south-facing entrance near the floor of about 10–15 cm<sup>2</sup> is favoured and, although other directions are accepted, sites in full sun are rejected.

The timing of bait hive placement is important and an assessment of the peak period for swarming in the area is essential for maximum success. Of course each season is different, but the general trend gives us an idea about our own area, wherever that may be. Early in the season there will be few swarms. By late summer a swarm will need feeding and nurturing, and still may not build up in time for winter. The optimal time to set up a bait hive then is mid to late spring. Swarming is linked to colony build-up, so those with plenty of forage, with a healthy environment and free from disease will become congested early, especially if they have a young, vigorous queen in full lay and are housed in small hives.

### Making a bait hive

To make a bait hive you need a dry plywood box, around forty litres capacity; a standard Langstroth brood body works

well. The bees do not appear to have a preference for the colour of the box. The top should be removable to enable the swarm to be transferred easily to its permanent home. It must be waterproof, even if this means taping a plastic bag to it. Create a hole for the entrance near the bottom as described above and cover with mesh. This prevents birds attempting to nest in it but allows bees to fly freely. Include a hanger of some kind to fix the box to a tree or structure at the appropriate height, shaded, but in full view, so that scout bees will find it easily. It is not easy to attach a bait hive to a high tree, but it should be placed as high off the ground as possible, up to four metres.

The box should be furnished either with frames or with bars fitted with strips of beeswax. Old brood frames and wax are to be avoided as they will attract wax moth. A lure comprising an artificial Nasonov pheromone, available from beekeeping suppliers, or some lemon grass oil is placed just inside the entrance. Bees expose their Nasonov glands and 'scent fan' with their wings to beckon nest mates and as they are attracted to the familiar odours of the hive this will help to advertise the presence of the bait hive.

### Monitor bait hive occupancy

Once in place the bait hive should be monitored regularly. An occupied hive will show pollen being brought in and the behaviour of the bees around the entrance, taking orientation flights or leaving directly to forage, are other clues. It should not be left in place long enough for the bees to take a heavy harvest of honey as removing a heavy box is not easy and possibly dangerous if it has been fixed at the optimum height requiring the use of a ladder. Transfer it in plenty of time for the new colony to build up stores of honey and pollen for the winter. This should be no later than the main summer nectar flow. A smoker and a bee suit must be used because, as with all beekeeping activities, health and safety are paramount. Treat the hive with the same respect as any colony and take care as the honeycomb inside will be new and fragile. Avoid aggravating the colony as much as possible.

### Relocating an occupied bait hive

To transfer bees from the bait site, close off the entrance when the bees are not flying, such as late evening, early morning or in wet weather, with bee-proof mesh for ventilation attached with duct tape. Use common sense if the hive is up a tree and accessible only by a ladder and observe normal safety precautions, working with a helper. Transport it gently to the place where the bees are to be hived. This should be a quarantine apiary, away from the home bees until the colony has been assessed as healthy and good tempered. Moving bees should be carried out when it is cool, such as late in the evening or early in the morning. This is because bees become agitated and cannot keep the internal hive temperature to a reasonable level if they are unable to ventilate sufficiently, and this can cause new combs to collapse, killing bees in the ensuing mess. Never leave bees closed in the hive for any length of time as they may suffocate.

### Transferring the bees to permanent hives

As soon as possible transfer the colony to a clean, dry, used standard hive. Using frames in the bait box makes this easy as they can be placed directly into the prepared hive, keeping them in the same order. Brush remaining bees gently into the hive and feed in the evening with light syrup (1kg white sugar to 1.25 litres of water).

### Where there is insufficient drawn comb

If the swarm has not drawn much comb yet, the strategy is that of housing a swarm cluster captured in the open. Prepare the hive with a brood box containing a comb of brood and filled with drawn comb or foundation and remove four or five combs from



A bird box used high in a tree.

the centre. Shake the bait box over it. Usually bees will stay with brood. Assemble the hive and feed as above. Alternatively, with the hive assembled, spread a white sheet on a board leaning up to the entrance and shake the bees onto it. They will turn and walk up into the hive, a magical sight. Feed as above.

### When top bars are used in the bait hive

If only top bars are used in the bait hive and some have been drawn into comb this may be cut out and tied into empty non-wired frames. Put three or four strips of any flexible tape on a flat surface, put the empty frame over them, lay the comb on this and tie in with the tape, then place upright in the hive. Bias binding tape used by dressmakers works well. The bees will soon fix the comb in place, but it makes a bit of a mess. Once the colony expands such comb can be replaced, but using it initially helps colony cohesion and boosts its initial population. This method may be used when removing a wild colony which has taken up residence somewhere unsuitable such as a garden shed.

### To minimise disturbance to an established swarm

Less disturbing for a well-established swarm with a lot of brood and honey is to put the bait hive on a stand, remove its top and add a brood or super box above, with frames and foundation or drawn comb. Check after a week or so and when eggs are present in the top box, add a queen excluder between the two. The chances are that the queen is in the top box, but if after another few days eggs are not seen above the excluder, remove it and repeat. Twenty-four days after confining the queen to the top, all the brood in the bottom bait box will have emerged so this box can be removed, the top one placed on the hive floor and the colony left to build up normally.

### Check the colony well

Now the colony should be inspected regularly and thoroughly for health and temper. Once deemed disease-free and of gentle disposition the hive can be moved into the home apiary. The colony can always be re-queened if satisfactory in all but temper.



A swarm entering an old brood box.

After recovering any spare comb and cleaning it up, the bait box may be re-used as long as it is not too late in the season. A little experimentation and experience will soon reward the beekeepers with a finely-honed technique and, hopefully, will increase their colonies and eventual honey crop. Happy hunting!

### Reading

Seeley TD, Morse RA, Novogrodsky R. *Bait Hives for Honey Bees*, Information Bulletin 187, A Cornell Extension Co-operative Publication.

Seeley TD. *Honey Bee Democracy*, Princeton University Press, 2010.

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# Swarm Departure and Nest Site Selection

By Tony Harris NDB, Scottish Expert Bee Master, Morayshire

*As part of our swarm preparations this month Tony Harris tells us how honey bees decide when to swarm, how they reach consensus on a new nest location and how a swarm is guided to its new home by its scouts.*

Professor Tom Seeley in *Honeybee Democracy* writes about how a swarm of honey bees displays a form of collective intelligence in the choice of its new home. When conditions are right, about a third of the worker bees stay at home and rear a new queen while the other two-thirds of the workforce, maybe 10,000 or 20,000 bees, fly off with the old queen to create a new colony.

This 'prime swarm' (photo below) settles into a cluster near to where it will remain for several hours or even days. A few hundred scout bees explore about 70 square kilometres (about 30 square miles) of the surrounding landscape for potential new homes. They will locate maybe a dozen or more potential sites, evaluate each one against certain criteria, and democratically select the best site for the new colony. Then, shortly after completing the selection process, all the bees in the swarm take off *en-masse* and fly straight to their new home a couple or more miles away.

This is a truly remarkable process and one that continues to fascinate me. How do the bees make such a complex decision? How do they get that decision right and how do they stay together on the flight to what

could be just a small hole in a tree two or three miles away when only a few hundred of the bees actually know where they are going?

Assuming the weather is favourable, a swarm will emerge around midday. With the queen, it will settle, usually within 10–20 metres of the hive, the bees attracted by the Nasonov pheromone from worker bees that settle first, and then, when the queen arrives, by queen pheromone, 9ODA, which provides cohesion and keeps the swarm cluster together.

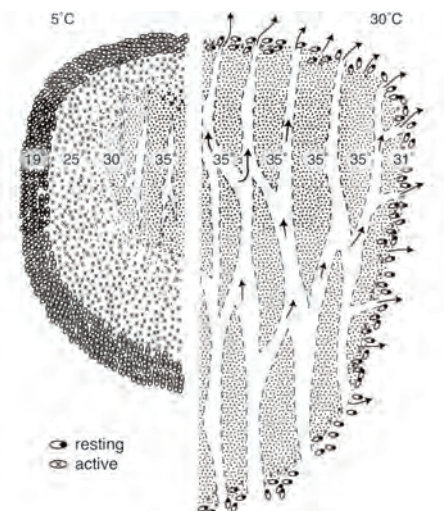
## Swarm temperature regulation

A swarm has the ability to regulate its temperature without using up the valuable honey the bees gorged on before leaving the hive. This is important because the stores will be needed to produce comb in their new home.

If necessary the bees cluster more tightly to conserve heat or if it is a warm day they



A prime swarm. Photo by Alastair Welch.



Temperature profiles of a swarm at low (5°C; 41°F) and high (30°C; 86°F) ambient temperatures. The diagram shows the positions of bees, channels for ventilation, losses of heat (arrows), and areas of active metabolism (crosses) and resting metabolism (dots). From *Honeybee Democracy* (Princeton University Press) and used with permission of the author, TD Seeley.

loosen the cluster to prevent overheating. Regardless of the ambient temperature they keep the swarm core at 35°C and the mantle above 17°C like they do in a winter cluster. The bees vary the temperature of cluster's mantle (outer layer) by letting the individual bee's temperature drop and by huddling rather than shivering. Below 17°C the mantle bees tighten the cluster, but it is only when the temperature falls below 10°C that the mantle bees generate extra heat by shivering their flight muscles.

### Nest site criteria

Older foragers, about 5% of the population, become scout bees; from about three days before the swarm issues they stop foraging and begin searching for a new nest site. After the swarm issues they begin their search in earnest. They are looking for a cavity of between 20 and 80 litres, with a relatively small entrance of less than 70cm square at the bottom of the cavity. They prefer the cavity and entrance to be about five metres above ground. If the cavity has comb in it, built by a previous colony, it is particularly attractive to the bees; they can use it to store nectar and pollen and the queen can commence laying earlier. These preferences are useful to know if you are setting up a bait hive nearby.



Photo showing a cavity (arrowed) high in a tree, courtesy of Tom Seeley.

The scout bees will inspect potential cavities for up to an hour, releasing attractive Nasonov pheromone as they do. They will walk an impressive sixty metres inside the cavity, covering all the inner surfaces, alternating this with trips outside where they perform short 'hopping' flights around the entrance. Each scout then returns to the swarm cluster and performs the waggle dance, the most vigorous dancers attracting more foragers who then go and check out the site. If the recruits agree that the site is the ideal home they will return to the swarm and perform the same dance.



Waggle dancing bee. Photo by Tom Seeley.

### Reaching a consensus

There may be many different dances taking place initially but eventually one group of dancers will dominate. Consensus is reached when a threshold of about twenty to thirty bees are visiting a particular site and returning to the swarm to announce to the other bees that the debate is over and they can proceed to their new home.

Seeley and colleagues also found that as well as positively advertising a good nest site by waggle dancing, the bees also have a stop signal, a bee head butt, which they use to prevent other bees advertising nest sites they disagree with. When choosing between two nest sites, the scout bees committed to each nest site direct these head butts to scouts promoting the other site in an attempt to sway the final decision.

The stop signal is a very short vibrational signal with a frequency around 350 Hz. It is delivered, by the sender butting her head against the dancer. Although the dancer may not show an immediate response to the signal, the accumulation of such stop signals very often causes the receiving bee to stop dancing. The stop signal is also used in the productive honey bee colony to inhibit a waggle dancing bee recruiting more foragers when, for example, a change to water collection is needed.

### Initiating take off

The scout bees now perform piping signals on the swarm cluster and this induces the many thousands of non-scout bees to warm their flight muscles in preparation

for flight to the chosen site. The piping noise is generated by a worker bee pressing her thorax, with wings pulled tightly together over the abdomen, onto another bee. While doing this she activates her wing muscles producing the 'piping' sound, described by Seeley as a 'sound resembling a Formula One car revving up'. The piping increases and builds to a climax just prior to take-off. The scouts also perform the buzzing run (see below), running excitedly among groups of torpid bees with buzzing wings outspread, pressing against bees and shaking them, before repeating the process again and again. Research has shown that take off begins only a few seconds after 100% of the bees have warmed themselves up to 35°C, the critical temperature at which they can fly. It is possible, therefore, that the buzz runner senses the swarm bees' temperature as she presses against them. Then suddenly, the swarm takes off as one!



Bees on the surface of a swarm photographed by infrared video camera. Left panel: 15 minutes before take-off. Right panel: 1 minute before take-off. The bee temperatures range from around 25°C (77°F) for the darkest to 41°C (106°F) to the lightest. From *Honeybee Democracy* by Tom Seeley.

### Steering the swarm

Tom Seeley's experiments showed that the cloud of swarming bees hung over the cluster site for about 30 seconds after take-off and then began moving slowly in the direction of the new nest site. It covered the first 30 metres at less than 1 kilometre an hour, but accelerated steadily so that after 150 metres it had reached its top speed of 8 kilometres per hour. About 90 metres from the new site the swarm gradually decreased in speed before coming to a halt in mid-air within five metres of the nest entrance.



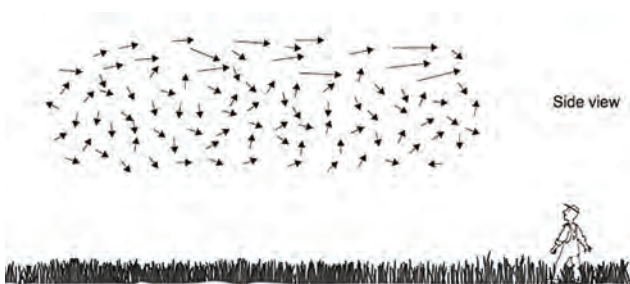
A worker bee performing the buzz-run through a small group of lethargic bees. Panel 1: The buzz-runner runs toward the quiet bees. Panel 2: One second later, the buzz-runner makes contact with the cluster, spreads her wings and buzzes the other bees. Panel 3: One second after making contact, the buzz-runner continues pushing through the cluster, still buzzing her wings. Panel 4: Still buzzing her wings, she runs off. Drawing by Barrett Klein, from *Honeybee Democracy* (Princeton Univ. Press) and used with permission of the author.



As long as the queen is in the skep the bees will join her. Photo by Alastair Welch.

I have already pondered on the wondrous task that enables a swarm of maybe 10,000 bees to fly straight from the cluster site to the new dwelling place with ease when only about 5% of the swarm actually know where they are going. The distance can be up to several miles away but how do they do it?

You will not be surprised to learn that the resourceful scout bees are also responsible for steering the swarm to the new nest site. As the bees hang over the clustering site in mid-air, the scout bees, now known as 'streaker bees', fly backwards and forwards at the top of the swarm cloud at around 20mph releasing Nasonov pheromone. The swarm follows these 'streaker' bees and the queen's 9-ODA pheromone helps keep the swarm together until it reaches its new home. Scout bees alight at the entrance, releasing more Nasonov pheromone to guide the swarm into the nest.



Starker bees. From: *Honeybee Democracy*, by Tom Seeley.

### What we can learn from the bees' behaviour when dealing with swarms

- Swarms will regularly settle on the same tree or other location in an apiary and this is thought to be due to the pheromones remaining there from previous swarms. You can take advantage of this behaviour by making your own swarm post. Wipe the post regularly with a swarm lure wipe; some suggest squashing unwanted queens on the post.
- Swarms generally settle near the hive and hang in a cluster

while scouts seek out a new home. This may take several hours or several days and it gives the beekeeper the best chance to collect the swarm.

- Before flying to their new home, the bees in the swarm must raise their temperature to 35°C, so spraying a swarm with cold water to cool the cluster will give you some time to gather your equipment and retrieve the swarm.



Swarms will move upwards into dark space. Photo by Tony Harris.



Swarm moving into a bait hive. As anyone who has seen a swarm arrive at a bait hive will agree that it is a wonderful site, even more wonderful when they march into the hive. Photo by Alastair Welch.

- A swarm clustering site will have significant levels of pheromone left on it when the swarm is dislodged. Bees will fly back there, but this should be overcome by smoking it.

### Swarm survival rates

Because a swarm contains bees of all ages, as soon as the swarm moves into its new home the population begins to decline due to the natural death rate. The colony's survival is dependent on the bees clearing out the old nest site, making new comb from the honey in their crops, collecting nectar to enable more comb to be built, collecting and storing pollen and, most importantly, the queen needs to lay eggs to replace the dying bees as soon as possible. It is a precarious time for the colony and Seeley found that 80% of swarms moving into natural cavities fail to survive the first winter while Winston states that only a quarter of swarms actually survive. The good news is that if a swarm moves into your bait hive you can improve its chances of survival by feeding sugar syrup and maybe by adding the odd frame of sealed brood from other disease-free hives in the apiary.

### Further reading

Seeley TD. *Honeybee Democracy*, Princeton University Press, 2010.  
 Seeley TD. *Honeybee Ecology: A Study of Adaptation in Social Life*, Princeton Legacy Library, 1985.  
 Winston M. *The Biology of the Honey Bee*, Harvard University, Massachusetts, Harvard University Press, 1987.  
 Chilcott A. Swarms Signals. *Bee Culture* June 2016.

- Bees tend to move upwards rather than downwards. This is useful when collecting a swarm on a post, as the skep or box can be placed on top of the post and the bees encouraged upwards with gentle smoking.
- Swarming bees will congregate around the queen. When collecting a swarm in a skep or box as long as the queen is inside the bees will eventually join her.
- Bees will release Nasanov pheromone and fan their wings to call in other swarm members. This is useful when the queen is boxed on a sheet, as the fanning bees will attract stragglers to join them.

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# Beekeeping Equipment and Gadgets

By Graham Royle, NDB, Cheshire BKA

*If, like Graham Royle, your hive numbers and associated bee equipment have expanded recently, you may find Graham's solution of a bespoke, multi-purpose shed useful.*

A while ago, I met up with a novice beekeeper who had attended a beginners' course I had tutored a few years previously. I asked how he was getting on with his bees and I have always remembered one thing he said: "On the course, when you were talking about the equipment we needed to keep bees, you never told us that we would also need a shed!" It is true that although not essential, a shed certainly is a useful addition to your beekeeping especially if you have expanded beyond an initial 'two hives at the bottom of the garden.

## Multi-purpose store-workshop

When my beekeeping had expanded to keeping ten colonies I decided that I would have to do something about the ever-growing pile of equipment, spare hives, extractor, honey tanks, buckets, etc that was building up in my garage and workshop. This was especially a problem over the winter months when supers taken from the hives needed to be stored and protected from the weather. If I was to have a bee shed, then I decided it should be designed for the intended purpose. As well as being a place to store equipment, it should be useable as a workshop for assembling hives and frames. If it could also be built to be suitable for honey extraction, then I could avoid the problems associated with having to take over the kitchen, with all the work that entailed moving equipment in and out and trying to avoid spreading honey throughout the house. For a bit of fun, I also decided that the bee shed should 'look the part'. I would have liked to paint it white, as is the tradition for that type of

hive but I decided that at the size it was it would be too distracting in the garden. The walls and roof are insulated and the inside is lined with white faced hardboard. It has kitchen worktops installed and a sink with tiled splashback. This allows all the surfaces to be washed down before starting honey extraction. Fitted plywood covers can be put in place over the worktops to protect the surface when assembling hives or frames.

The rear wall of the shed is inset under the roof far enough to allow for storage of spare hives. This arrangement has proved to be very useful as it keeps the stacks of spare equipment out of the shed. During the winter months it provides protection from the worst of the weather, but it does expose the combs to the cold and frost to help with the control of wax moth.



The shower base on its raised plinth.

In addition to the sink, I have installed a shower base on a raised plinth. This is for washing out settling tanks and the extractor, and is a much easier method than trying to wash them under the sink.

## Extraction solutions

When extracting honey, I often found that there would be a build-up of bees flying around inside the shed and gathering on



Left: My bee shed; Right: The storage area at the rear of the shed. All photos by Graham Royle.



**Top:** Shed window, showing the shaped acrylic escapes.

**Bottom:** Sketch of the window pane arrangement, with its one bee space separation between top and bottom panes.

the window trying to get out. To overcome this, I modified the window glass by fitting two panes, separated by a bee space. The inner pane does not reach the bottom of the frame, and the outer pane does not reach the top. Bees landing on the window crawl upwards, between the two panes and can escape outside at the top. Some were smarter than this and could find their way back, probably attracted by the smell of the honey inside so I added shaped escapes between the panes to act like cone escapes on a clearer board. These have a wide entrance at the bottom, and a narrow exit at the top. They were simply made using offcuts of acrylic sheet glued to the glass with silicone sealant.

The extractor is mounted on a raised plinth. This enables a bucket to be placed under the tap and avoids having to lift a full extractor when you want to empty it. My extractor is a nine-frame motorised radial design. The variable speed controller which came with it had a simple rotary knob to adjust the speed. I replaced this controller with a version which lets me define a speed vs. time profile. This is set up to run for five minutes at 25% speed before gradually increasing speed to 100% over another five minute period. I did this so I can leave the extractor spinning out the honey while I uncap the next set of frames. An unexpected benefit I found was that the initial slow run helps to even out the balance of the combs in the extractor as the heavier ones lose more honey. When the extractor subsequently speeds up, the

improved balance means it does not shake around in the shed quite so much. I guess I was too impatient with the original manual control as it always seemed to be shaking about. The ten minute cycle time gives me enough time to uncap the next nine frames ready for extraction.



**Top:** My honey extractor mounted on its plinth with its variable speed controller seen to the top left.

**Bottom:** The level sensor, which alerts me to an imminent overflow!

Honey flowing from the extractor makes no noise and it is all too easy to forget that the tap is open, especially if I am distracted uncapping the next batch of frames. To avoid the risk of an overflowing bucket, the waste of both time and honey, and the need to clear up the mess, I have a level sensor which can be clipped to the side of the bucket. Once the honey reaches the level of the pins on the sensor, a siren goes off in the shed to alert me to the impending overflow so I can close the tap. Water level sensors suitable for this purpose are readily available from on-line vendors.

### Lost-cost warming cabinet

A warming cabinet is an invaluable piece of equipment for processing stored honey. It allows granulated buckets of stored honey to be gently warmed to the liquid state ready for bottling. Warming cabinets are available from bee equipment suppliers, but an old fridge can be adapted to make

an excellent low-cost alternative. After all, a fridge is simply an insulated box designed to keep the cold in, but it is just as effective at keeping warmth in. It also has a convenient door and shelves which can be used to hold jars for warming, and if the shelves are removed a 30lb bucket will easily fit in. All that is needed is to install a couple of lightbulbs at the bottom of the fridge. These need to be old-fashioned incandescent bulbs, not the modern low energy types as it is the heat we need, not the light. I made a wooden box for the bulbs, with a mesh top to allow the heat



**My honey warmer, made from an old fridge and a couple of light bulbs.**

out. I also included a small fan in the box, salvaged from a scrapped desktop computer, to generate more movement of the warm air. Finally, a thermostat was added, so that the temperature could be set either to 35°C to warm a bucket of granulated honey to stirring point, or to 47°C to liquify it completely.

Now that my beekeeping has expanded to managing twenty-plus colonies, the shed is no longer big enough to store all my equipment over winter, but that is another story...

I hope you have enjoyed this series of articles and found at least one piece of equipment or gadget that I have described that you will find useful for your beekeeping.

*“...although not essential, a shed certainly is a useful addition to your beekeeping...”*

# Readers' Questions Answered

By Wally Shaw, BSc, Anglesey BKA

**Q:** *When there are queen cells in my hive, why should I leave just one queen cell? I have always thought I should leave two and have a backup. And why should they be open cells? Why not just remove all the swarm cells? Wally Shaw provides some answers.*

These sound like simple questions, but this could hardly be further from the truth. Queen cells appear in a colony for several quite different reasons.

- **Supersedure.** Here, the colony is seeking to replace an old, failing or for some reason unsatisfactory (to them) queen. Supersedure is most common in the spring or late summer, but it can occur any time.
- **Emergency re-queening.** In this situation the colony has lost its queen, for whatever reason, and is trying to replace her. Emergency queen cells can only be produced if it is less than five, possibly six, days since the queen laid her last eggs. Emergency cells can occur at any time, but unless there are drones around re-queening will not be successful.
- **Swarming.** Swarming occurs when the colony perceives itself to be in a state of development where reproduction by splitting is likely to be successful. The main swarming season is late April through to early July, but recent weather can also play a part in a colony making the decision to swarm.

## Identify the queen cell type before taking any action

These are three distinct behavioural programmes with different aims and outcomes and it is essential that when queen cells are found the beekeeper knows which route the colony is following before intervening. In the case of supersedure and emergency re-queening the colony has no intention of swarming and no action by the beekeeper is required. Thinning of queen cells is totally unnecessary and, indeed, most undesirable. I suspect that most claims that colonies have swarmed during supersedure or emergency re-queening are, dare I say it, the result of poor observation; the beekeeper has not understood what is going on and has jumped to the wrong conclusion. There may be rare exceptions to this rule, but in thirty years of beekeeping, running forty-plus hives for most of that time, I have never encountered one.

## Do we thin out queen cells or not?

Be aware that most beekeeping books are extremely confused on the issue of thinning queen cells. They often advise thinning whenever multiple queen cells are encountered. However, some writers give the game away by saying something like 'thin them just to be on the safe side'. It is unfortunate that it is not the bees that write the beekeeping books, because they are best placed to know what they are doing. Evolution has ensured that what bees



Supersedure cell



Swarm cells



Emergency queen cells

do naturally is adaptive, i.e. it gives them the maximum chance of survival and beekeepers should always try to understand what is going on. Our default position should be to assume that the 'bees know best'.

Thinning queen cells is an extremely undesirable activity and should be avoided wherever possible. A colony invariably makes more queen cells than it can possibly use. Exactly why they do this is not known but it certainly gives them the opportunity to pick and choose their new queen. The behaviour of the bees in the presence of maturing queen cells is complex, but it is clear that they are exercising choice. What criteria are involved is not known but, as stated above, it should be assumed that the bees know best.



**Emerged queen cell with 'lid'.**

The questioner is almost certainly referring to a colony that is attempting to swarm. The first thing to say, and this cannot be over-emphasised because people still do it, is that destroying queen cells does not prevent swarming. The best outcome is that it delays swarming by a few days and the worst is that the colony will become queenless. In this case, unless the beekeeper takes remedial action, the colony will be lost.

### Swarm cells: the most common type found

Swarming is by far the most likely reason for a beekeeper finding queen cells in a hive, nine times out of ten, and the visual evidence is usually unambiguous. In a typical swarming situation there will be 5–20 queen cells, but there can be many more that have been developed from pre-existing queen cups. These cells will normally be on the margins of the frame, but they may also be found on the face in depressions or flaws in the comb. In two brood box systems most of the queen cells are found along the bottom bars of the frames in the upper box.

When colony has set up to swarm there is only one circumstance in which it is necessary to thin queen cells and that is after the prime swarm has departed and there are still un-emerged queen cells in the hive. However, the exact status of the colony, i.e. how far swarming has proceeded, needs to be determined before the beekeeper takes any action.

### Actions you can take on finding swarm cells

*Options depend upon colony status*

If the prime swarm has not departed then the appropriate action is to artificially swarm the colony. How can you tell if this is the case? In order for reliability, the evidence for a colony not having swarmed is:

- Seeing the queen.
- Newly laid (standing-up) eggs present.
- Colony is not obviously missing bees.
- Maturity of the queen cells; are any sealed? But be aware that colonies sometimes swarm before any cells are sealed, so this can be misleading.
- Recent weather; if this has been poor, swarming may have been delayed.

If it has been determined that the prime swarm has departed then action is required to prevent cast swarming. If careful examination of the queen cells reveals that no virgin queen has yet emerged then thinning is the normal solution. There is an alternative which is beyond the scope of this answer, but this information can be found in further reading detailed below.

### Thinning out

Thinning needs to be done scrupulously and at least some of the

bees need to be shaken or brushed off the frames so that no queen cells are overlooked. Now we come to the first part of the question: should you leave just one cell and should it be sealed or unsealed? Alternatively, should you leave two cells so that there is a backup, if one does not contain a viable queen?

### Do we leave sealed or open cells?

The most common advice is to leave just one queen cell and, if possible, this should be an open cell in which the contents, an apparently healthy larva, can be seen. I have never understood this advice; let me put a different point of view. The bees will only seal a queen cell if its occupant is alive and well at the time of sealing. It has to be emitting the correct pheromone signal. Although a larva in an open cell may look healthy to you, there is no guarantee that is the case and, for all you know, the cell may never be sealed. The other main argument against choosing an open cell when more mature sealed cells are available is that all you are doing is delaying the colony getting a new virgin queen. The delay could be several days and possibly up to a week; I have seen a colony in which there were queen cells with an age span of ten days. Unsealed cells could also represent something of an afterthought by the colony and may conceivably have been less well-tended than those started earlier.

### Do we leave one or two cells?

What about leaving two queen cells? In the past I have followed this option and, as far as I am aware it has worked; there have been no cast swarms. However, I did take the precaution of leaving cells that were 'thought' to be of the same age and would reach maturity at around the same time. In all cases I chose a pair of cells that were side-by-side on the comb under the assumption that they were likely to be of the same age. From experience of thinning queen cells and looking at the contents I know this is not always true. Does it matter? I have no idea.

### A word of warning

There is one final precaution that needs to be taken when thinning queen cells to prevent a cast swarm. If the colony has swarmed within the last five to six days there will still be brood present that is young enough to make emergency queen cells. Bees quite frequently do this and what will usually happen next is that the colony will swarm with the virgin queen from the cell you have carefully selected. The emergency cells will act as backup and be used to re-queen the colony. To avoid this happening there are two options: either you delay thinning the queen cells until the five or six days are up or you thin the cells now and come back later to check and destroy any later additions. Do not forget the five to six days starts from the day that the colony swarmed, estimated from the age of the youngest brood, and not from the day you found that queen cells were present.

### Further reading and information sources

This answer is a brief summary of what you may need to do when you find queen cells in a hive. It only covers one of a number of situations that can occur, namely that the colony has already issued a prime swarm. It is a common situation, but there are others. The whole subject is covered in more detail in a Welsh Beekeepers' Association (WBKA) booklet entitled *There are queen cells in my hive – what should I do?* This booklet contains a diagnostic tree consisting of ten steps, each giving instructions on the appropriate investigation (what evidence to look for) and the remedial action required. This booklet is free to download from the WBKA website at <http://www.wbka.com/wp-content/uploads/2015/04/wbka-booklet-english-PDF.pdf> A very simple and reliable method of artificial swarming, Snelgrove II modified, can be found in another WBKA booklet, *An Apiary Guide to Swarm Control*, which is also on the web-site <http://www.wbka.com/wp-content/uploads/2015/02/Swarm-Control-Wally-Shaw.pdf>

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# Your Letters

## *Stratiolaelaps scimitus*

My journey with bees started in 1962 when my mother bought an extractor, beehive and accessories at an auction for £2. For the next few years my brother and I kept three hives in our garden in suburbia. I continued until 1974 when I travelled overseas and for a couple of years attempted to support a friend in Ethiopia with his bees, but retired from beekeeping in the 1980s. With retirement in 2015, I was offered some beekeeping equipment and stationed the hives before the open fields of the Essex countryside.

As a regenerated beekeeper, the sticky question of varroa arises. I have searched my hives and have not detected any varroa. What I did find was a minute (white) mite, less than 0.5mm. This was diagnosed as *Stratiolaelaps scimitus*, and it will apparently prey upon varroa. The dilemma: do you seek to destroy varroa that might be there with your anti-varroa treatment and at the same time kill this beneficial critter?

**Stephen Bazlinton, Essex BKA**

## In Response

Varroa control is a difficult subject as we are not in a position to eradicate the pest, but need to keep it under control so as not to exacerbate the virus loads within our colonies as it is the viruses that kill the colony. The Holy Grail for beekeepers must be to find an ongoing harmless treatment, without using chemotherapy, which would reduce mite population growth by about 5% per day. This would stop the exponential mite population explosion and leave our colonies safe from varroa issues. Predator mites may seem to fit this bill.

*Stratiolaelaps* sp. mites, particularly *scimitus*, are predatory and commonly used for the control of pest mites in reptiles, poultry, and in the horticultural business. Their natural habitat is in the soil, but they have been recorded in beehives, which may appear unusual though it is a reasonably dark environment. As they are a native species, have no known detrimental effects to insect

species and are said to be able to kill up to ten varroa mites in a day they do seem to be a candidate, especially as they are readily available. However, it has been shown that these mites are quite happy consuming dead varroa.

In 2012 and 2013 the Devon Apicultural Research Group (DARG) were involved in a trial on behalf of The Bee Vet at Lymington. A report on this can be found at [www.dargbees.org.uk](http://www.dargbees.org.uk). Although the data obtained showed some promising reductions in early summer, little practical benefit was found by the end of the beekeeping season. The conclusions reached by DARG were that:

- The efficacy was too low. Bio-technical control of varroa is far more efficacious at present. Some techniques have been found to be far more effective than some chemotherapy treatments.
- Application methods need developing for the best results.

The main questions that the trial raised were:

- What is a predator mite's active 'life' in a honey bee colony? The bee brood nest temperature is known to be close to the predator mites' maximum temperature limit and because of this they are probably unable to reproduce in a beehive. This means several applications a season resulting in a high-cost treatment.
- Do predator mites damage bee brood? Although not said to prey on insect species would they feed on larvae if there was an inadequate natural food source, such as varroa mites, available. They could then become a vector for virus diseases in the bee colony.
- Do predator mites prefer to feast on dead varroa? If so then they would not be much use.
- What disease introduction risks are there?

Varroacides will kill *Stratiolaelaps* sp. so if you wish to maintain the natural organisms in your hive the best advice currently available is to use bio-technical management methods. Some of these can result in 95% efficacy, which is better than many chemotherapy treatments.

**Richard Ball, Chairman DARG, Past National Bee Inspector**

## Diary Dates

**April 1. Northern Beekeeping Convention** at the Beacon, Newcastle upon Tyne. Speakers: John Hobrough, Philip McCabe, Prof Robert Paxton and Dan Basterfield.

**April 1. Avon BKA Spring Day School**, Village Hall, Shipham, Somerset, BS24 1SG. Lecturers include Jamie Ellis. Cost £10 at door, includes lunch and refreshments. Booking essential via [annerowberry@gmail.com](mailto:annerowberry@gmail.com); Tel: 07802425929

**7-9 April. BBKA Spring Convention**, Harper Adams University, Newport, Shropshire, TF10 8NB.

**22 April. West Sussex BKA Annual Bee Market and Auction** at Brinsbury Campus, Pulborough. Info: [www.westsussexbeekeepers.org.uk/auction.html](http://www.westsussexbeekeepers.org.uk/auction.html); Graham Elliott [secretary@westsussexbeekeepers.org.uk](mailto:secretary@westsussexbeekeepers.org.uk); Tel 01403 752493; Mob 07761 349281.

**23 April. BBKA Microscopy Training** four-day course, Lewis Woolnough, University of Hertfordshire, Bayfordbury Campus, Hertford (A10). Details: [training@hertsbees.org.uk](mailto:training@hertsbees.org.uk)

**26 April. Somerset BKA Special Lecture**, 7.30 at Edgar Hall Somerton. Dr Giles Budge: The Foul Brood Gang: Tracking and tracing honey bee killers. Details: Sharon Bake 01460 242124

**30 April. Beverley BKA auction of honey bees and beekeeping equipment**, 12 noon, Woodmansey Village Hall, Long Lane, Woodmansey, HU17 0RN, Info: [auction@beverleybeekeepers.co.uk](mailto:auction@beverleybeekeepers.co.uk) or Dave Hodgson 07875 393 588.

**6 May. MVBKA 38th Annual Auction of beekeeping equipment and bees**. 1pm, Greatham Village Hall Hampshire, GU33 6AD. Stalls from 10.00am, viewing from 11.30am; lots accepted until 23rd April. Catalogues (50p + SAE); Info: Margaret Pallant 07784 773345; [margaretpallant@btinternet.com](mailto:margaretpallant@btinternet.com)

**6 May. Somerton Division of Somerset BKA**. 2pm at Long Sutton Village Hall, TA10 9NT. The inventor of the Flow Hive, Stuart Anderson, tells the story of its development. Cost £5. Details: [Steve.horne1@btinternet.com](mailto:Steve.horne1@btinternet.com)

**13 May. GBKA Auction**. at Cotswold Riding for the Disabled Indoor School, Prestbury Park Racecourse, Chelt. GL50 4SH. Details: [www.gbka.org.uk](http://www.gbka.org.uk) or Bernie Danvers 01594 825063.

**20 May. General Husbandry Preparation** two-day course, Alastair Welch, University of Hertfordshire, Bayfordbury Campus, Hertford (A10). Details: [training@hertsbees.org.uk](mailto:training@hertsbees.org.uk)

**7-11 June. RHS Chatsworth Flower Show**. BBKA Stand will be present.

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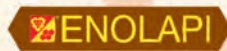
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- Fragile Planet Ltd**, Unit 5, Maesbury Road Industrial Estate, Oswestry, Shropshire, SY108HA - www.fragile-planet.co.uk
- Hodge Clough Honey Bees**, Hodge Clough Farm, Wilkes Street, Oldham, OL14JW - Johnogdenoldham@hotmail.com
- Paynes Bee Farm Ltd**, Wickham Hill, Hassocks, West Sussex, BN6 9NP - Tel. 01273 843388 - www.paynes-beefarm.com - www.iwantbees.co.uk
- Peter and Marian Guthrie Wyfield Apiaries**, Ty-Gwyn, Boughrood-Brest, Llyswn, Brecon, Powys, LD30BQ - Tel. 01874 754412
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