

ISSUE 3 · MARCH 2022

# THE BUZZ

Newsletter of the British Bee Veterinary Association

## Welcome!

CHRIS PALGRAVE, EDITOR

March has to be one of the most exciting months of the year as spring buds burst, activity increases at hive entrances and early bumblebees and solitary bees start to make an appearance. However, the weather is fickle and colonies are still vulnerable to prolonged spells of cold, wet weather and sharp frosts. The aged winter honey bees are busy feeding expanding brood nests and trying to keep them warm, while food stores may be running low and nectar is still in short supply. We are not quite out of the woods yet... but very nearly!

In this issue, BBVA President, John Hill, discusses the travesty of honey adulteration, Scottish Expert Beemaster and Beelistener blog author, Ann Chilcott, opens our eyes to the importance of the misunderstood drone, and Chloe Headdon from the Bumblebee Conservation Trust tells us about their Bee the Change 2022 campaign; she has also kindly provided some resources on [pages 9&10](#). We also introduce the removable frame beehive, meet the Southern cuckoo bee, review the new 'Honey Bee Medicine' textbook, and focus on the magnificent sunflower in support of our beekeeping friends in Ukraine.

Finally, don't forget the BBVA April 2022 Webinar Series is just around the corner! We are thrilled to have three fascinating talks by a panel of expert bee scientists, including:

- Prof Dalial Freitag: '[How to vaccinate a beehive](#)'
- Dr Úna FitzPatrick: '[The all-Ireland pollinator plan](#)'
- Prof Stephen Martin: '[Honey bees fighting back against Varroa](#)'

Please see the flyer on [pages 11&12](#) for more information and instructions on how to book.

## This issue:

Honey adulteration

[PAGE 02](#)

Home Sweet Home

[PAGE 03](#)

The Drone

[PAGE 04](#)

Bee the Change 2022

[PAGE 05](#)

Southern cuckoo bee

[PAGE 06](#)

Plant file: Sunflower

[PAGE 07](#)

Bee bookshelf: Honey bee medicine

[PAGE 08](#)

Information and contact

[PAGE 08](#)

Bonus Bumblebee Resources

[PAGES 09 & 10](#)

BBVA Webinar Series April 2022

[PAGES 11 & 12](#)



## Honey adulteration

JOHN HILL, BBVA PRESIDENT

Honey is the third most adulterated foodstuff in the world, after olive oil and coffee. The UK consumes about 43,000 tons of honey per year, 95% of which is imported; China is the main source, with significant volumes coming from India, Ukraine and Vietnam.

The EU has a set definition of honey (Honey Directive 2001/110). It is an exclusive product of bees and must be mature with a water content no greater than 20% (otherwise fermentation will occur). There must be no extraction of particular constituents (e.g. pollen grains) and no significant degradation of natural enzymes. Adulteration occurs at different levels and can be summarised in three main areas:

### Non-mature honey harvest

In China, nomadic beekeepers start in the south and move their hives northwards every month to obtain 5-6 harvests per year. The bees bring in nectar (up to 70% water) which they do not have time to mature into honey. The beekeepers remove the nectar and factories reduce the water content to 20% or less. It is not honey as the bees would usually add enzymes to it during the maturation process. The factories also remove antibiotics which they do not wish to show up in tests.

### Addition of sugar syrups

Honey has cheap sugar syrup added to it to bulk it out. This is usually corn, rice or sugar beet syrup. Recent technological advances have allowed detection of adulterated honey, including Nuclear Magnetic Resonance (NMR), Elemental Analysis - Isotope Ratio and Mass Spectrometry (EA-IRMS) and Liquid Chromatography. Even with these sophisticated techniques, not all adulterated honey can be detected. The fraudsters are always producing new “designer” syrup combinations to beat the laboratory analysis.

### Botanical and Geographical fraud through mislabelling

Many honeys purport to come from certain locations or to be the product of a particular floral source. A classic example is Manuka honey, which has a floral source of the Manuka plant and is in high demand. It is estimated that five to six times more Manuka honey is sold than can be produced. In the past, honey was authenticated by examining the pollen grains, which would reflect the local flora. The fraudsters, however, ultrafiltrate cheap honey to remove any pollen grains and then add in pollen sourced from the desired location.

One official survey estimated the level of adulterated honey in British supermarkets at 14%, with caveats that the level could be much higher. One Chinese whistle-blower claimed that Chinese imported honey was diluted by two-thirds with syrup. The EU and British Governments are due to make more arrangements for the detection of fraudulent honey, however these have been delayed by the covid pandemic. A cheap jar of honey will have been imported and at present does not require details of source. Very often the price is less than the cost of production.

British beekeepers produce a premium product, which is popular and is worth the extra price, as beekeepers want to maintain their good reputation and will sell you the real McCoy.



## Home Sweet Home: Introducing the beehive

CHRIS PALGRAVE

The relationship between humans and bees stretches back to the dawn of civilisation. Mesolithic rock art from southern Europe, Africa and India depicts people scaling trees and cliffs, risking their lives to steal honey from wild bees' nests. The earliest known scenes of ancient beekeeping are from a bas-relief located in the Sun Temple of the Pharaoh Ne-user-re in Egypt (c. 2400 BC). It was said that when the sun god Re (Ra) wept, his tears turned into bees.

For many thousands of years, bees have been kept in a range of containers, from clay pots and stone chambers to bark hives, hollowed-out logs, cavities in tree trunks, coiled straw skeps and wicker alvearies plastered with cloom (dung). For the most part, what went on in these vessels remained a mystery, as the wax combs were fixed in place and there was no easy way to access or examine them. The bees were driven into an empty container, or in some cases killed, so that the honey, wax and other hive products could be harvested. However, following the invention of the 'removable frame hive' around 200 years ago, colonies could be more easily inspected and manipulated. Honey could also be harvested efficiently, without destroying the combs or rehoming (or killing) the bees; this effectively opened the door to the commercialisation of beekeeping.

Although there are many variations on the modern removable frame hive, the majority are based on a stack of boxes within which the wooden frames are suspended. The bees build their combs in these frames, often guided by a thin sheet of wax 'foundation'. The queen is confined to the bottom of the hive where she lays eggs and the brood (larvae) are raised. Honey is stored in the top part of the hive in boxes called 'supers'. The two areas are often separated by a perforated mesh (queen excluder) through which the worker bees are small enough to pass, but the queen is not. There is a crown/cover board and roof on top, and a floor with an entrance on the bottom. The hive boxes are traditionally made of wood, although other materials, including high density polystyrene, are becoming increasingly popular.

We will discuss the history and development of the removable frame beehive and modern beekeeping practice in more detail in future issues. We will also visit a range of other hive types and management systems.

**"First a settled site for your bees must be sought, where no winds may access (for winds prevent them bringing home their food), nor sheep or tussling kids romp upon the flowers, nor rambling heifer in the meadows to shake off the dew and erode the plantlife."**

VIRGIL (29BC)  
THE GEORGICS: A POEM OF  
THE LAND



EXAMINING A REMOVABLE FRAME IN A CONVENTIONAL MODERN BEEHIVE



## The Drone

ANN CHILCOTT, SCOTTISH EXPERT BEEMASTER AND AUTHOR OF 'THE BEELISTENER' BLOG

The drone (male bee) is probably the least understood member of a honey bee colony. He is also often the butt of anthropomorphic jokes and described as being greedy, fat, and lazy because he doesn't contribute to work inside the nest. He is accused of being around purely for sex (this is true...lucky him!) and graphic accounts of his post-coital demise send sniggers round a lecture room. That he has a mother and grandparents but no father can be confusing, and sometimes he is incorrectly accused of being a clone.

It is true that he isn't involved in the day-to-day work inside the hive. This makes sense, because he hasn't been shaped by natural selection to perform such tasks and he doesn't have the necessary equipment - such as pollen baskets to collect pollen or a sting gland to protect the colony. This is also why he is not a member of a caste like queens and worker bees who have jobs to do inside the hive. The queen lays eggs and the workers engage in lots of different tasks, which are graduated according to their age and physical development; this is termed 'age polyethism'. Queens and workers are members of the female only castes.



THE DRONE HAS SEVERAL PHYSICAL CHARACTERISTICS WHICH REFLECT HIS PRIMARY ROLE OF SUCCESSFULLY SEEING, CATCHING AND MATING WITH A VIRGIN QUEEN WHILE IN FLIGHT

LEFT: HE HAS A STOUT, BLUNT ABDOMEN AND BROAD THORAX HOUSING POWERFUL FLIGHT MUSCLES (PHOTO CREDIT: LINTON CHILCOTT)

RIGHT: HE HAS A LARGE PAIR OF EYES WHICH MEET IN THE MIDDLE (PHOTO CREDIT: TIM MCMAHON)

Honey bees belong to the Order Hymenoptera (membrane wings) and have the capacity to reproduce asexually through a process called parthenogenesis, whereby males develop from unfertilised eggs. Female honey bees have two sets of 16 chromosomes (termed diploid). Ploidy refers to the sets of chromosomes that carry genetic material. So, queens and worker bees have 32 chromosomes in total. Drones are haploid (derived from the Greek word haplous, meaning single) and have only one set of 16 chromosomes.

The sex cells or gametes produced by female bees are the result of an intricate dance of cell division called meiosis. During this process, there is shuffling and recombination of genes between her two sets of chromosomes, resulting in a suite of non-identical daughter cells. Because drones only have one set of chromosomes, their cells cannot undergo meiosis, so they produce genetically-identical gametes (similar to the replication of other body cells) through mitosis. However, a drone still inherits a random sample of half his mother's genes, including his grandmother and grandfather's genes, so is not identical to either his mother or his brothers.

As an adaption to being haplo-diploid, and possibly having reduced genetic diversity, honey bees have evolved a strategy called polyandry, whereby the queen mates with many drones. This helps the colony deal with the many viruses, diseases and other stressors that they encounter because their members are genetically diverse. Drones play a key role in passing on good genes and beekeepers are encouraged to preserve them, and promote drone rearing in their best colonies. For more on the drone please visit: [www.beelistener.co.uk](http://www.beelistener.co.uk)



## Bee the change 2022 with the Bumblebee Conservation Trust

CHLOE HEADDON, BEE THE CHANGE PROJECT OFFICER, BBCT

The Bumblebee Conservation Trust is the only charity wholly dedicated to saving the UK's bumblebees. We aim to inspire and enable a diverse range of people to take action to help bumblebees survive and thrive.

Over the past century, bumblebee populations have crashed in the UK (with 2 species becoming extinct) due to habitat loss: the result of large-scale changes to our countryside and towns. As key pollinators of many fruit and vegetable crops and wildflowers, their decline has serious implications for agriculture and biodiversity. Without bumblebees, our diets, our health and our natural world would be less rich – and our food scarce and expensive, with much less variety.

The good news is that we can all do our bit to give these charismatic insects a helping hand! This is why the Trust has launched Bee the Change, an online micro-actions campaign which provides people with quick, simple ways they can help their local bumblebees, with little input in terms of time and money.

Over 30 free resources are available on the Bee the Change website, including monthly bumblebee 'menus', gardening guides, how-to videos, downloadable posters and graphics, and bumblebee information and spotter sheets.

Anyone with a UK postcode can also pledge to Bee the Change for free, and receive simple ideas and new resources straight to their inbox every month. So far over 3,800 people have pledged their support!

If lots of people can do just one thing, together we can get bumblebees buzzing again.

To discover the free resources and pledge to Bee the Change, visit [bumblebeeconservation.org/beethechange](https://bumblebeeconservation.org/beethechange)

Additional Bee the Change resources and a 'Big 8' identification poster are also available on [pages 9&10](#).

### Five simple ways you can help bumblebees this spring:

1. Plant one of these herbs: mint, chives, rosemary, lavender, or thyme.
2. Make space for bumblebee nests by starting a compost heap or leaving patches of grass to grow long and tangled.
3. Mow your lawn less often so wildflowers like dandelions can bloom.
4. Tell someone else about why bumblebees are important and how to help them.
5. Join the Bumblebee Conservation Trust as a member from just £2.50 a month.

PHOTO CREDIT: PIETER HARINGSMA (COMMON CARDER BEE)



## The Southern cuckoo (bumble)bee

CHRIS PALGRAVE

Of the 270 species of bee in the UK, only one is the honeybee. In this issue, we are going to meet another of the bumblebees, however this time it is one of the six species of 'cuckoo' bumblebee in the UK. Like the bird, cuckoo bees lay their eggs in a host nest and allow the host workers to raise their young. Cuckoo bees typically mimic their host species and they can be tricky to tell apart.

The Southern cuckoo bee (*Bombus vestalis*) is common in the UK, particularly the south. Females seek out the nest of their host species, the buff-tailed bumblebee (*Bombus terrestris* - see Issue 2, January 2022), which they closely resemble. As they do not collect pollen (because they don't feed their young), their hindlegs are round, hairy and lack pollen baskets. The abdominal band is incomplete and broken on the dorsal surface; it is formed from two pale yellow side patches just in front of the buff-white tail. The thoracic band is complete and a darker yellow-orange.



THE SOUTHERN CUCKOO  
(BUMBLE)BEE  
(*BOMBUS VESTALIS*).

NOTE THE LACK OF POLLEN BASKET ON THE HIND LEG, THE DARKER ORANGE THORACIC BAND AND THE PALER YELLOW ABDOMINAL PATCH/BAND THAT DOES NOT CONNECT ON THE DORSAL SURFACE

PHOTO COURTESY: STEPHEN BOULTON  
([HTTPS://BEEKEEPERSGARDEN.WORDPRESS.COM/](https://beekeepersgarden.wordpress.com/))

"I want to be like a sunflower; so that even on the darkest days I will stand tall and find the sunlight."

ANONYMOUS

WE ARE GRATEFUL FOR THE GENEROUS SUPPORT OF OUR SPONSORS:





## Plant File: Sunflower (*Helianthus annuus*)

CHRIS PALGRAVE

It is difficult not to be mesmerised by these celestial giants blazing over our gardens. Witnessing the rapid transformation from humble pinstripe seed to behemoth of fairytale beanstalk proportions is etched into our early childhood memories of 'who can grow the tallest'. The scientific name is derived from the Greek 'helios' (sun) and 'anthos' (flower) - reflecting both their resemblance to the sun and ability to track it through the sky; their heliotropic behaviour is also captured by the French (tournesol) and Spanish (girasol) names. The Latin epithet 'annuus', reflects that the common sunflower is an annual (rather than perennial).

Each pollen- and nectar-laden flower head (inflorescence) makes a large, attractive target for pollinators, but is in fact a disc composed of numerous tiny flowers (florets) arranged in interconnecting spirals. Originating in the Americas, Spanish explorers encountered the sunflower in the 1500s and subsequently introduced it to Europe. It was particularly well suited to the hot, dry climate and rich dark soil of Ukraine, where it is the national flower. Ukraine is the largest producer and exporter of sunflower seeds worldwide. Sunflowers are also an important part of Ukrainian culture and folklore, being woven into wreaths, embroidered on fabrics, carved into furniture and painted on walls. They are also the subject of songs, poetry and art.



THE WHORLS OF INTERCONNECTING SUNFLOWER FLORETS FOLLOW A FIBONACCI SEQUENCE. THIS ENSURES THE MOST EFFICIENT PACKING OF SEEDS INTO THE FLOWER HEAD  
(CREATIVE COMMONS: CC-BY-SA-2.5 L. SHYAMALI)

### Sunflower trivia...

Sunflower seeds are highly nutritious and particularly rich in vitamin E. Ukrainians make a variation on the middle eastern sweet, halva, using sunflower seeds in place of sesame seeds. Traditionally, leaves were used as a diuretic, as an expectorant and to cure fevers. They are known to contain anti-inflammatory compounds (e.g. quercetin), and poultices were applied to wounds and insect bites. The seedheads, when left on the plant, provide a valuable food source for garden birds and other wildlife.

Traditionally, some Native American groups planted sunflowers as a 'fourth sister' to the better-known 'three sisters', corn, beans, and squash.

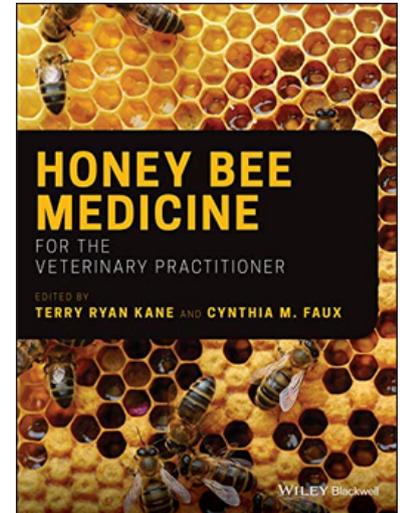
Each floret is oriented toward the next by approximately the golden angle,  $137.5^\circ$ , producing a pattern of interconnecting spirals, where the number of left and right spirals are successive Fibonacci numbers. Typically, there are 34 spirals in one direction and 55 in the other. This pattern produces the most mathematically-efficient packing of seeds within the flower head.



## The bee bookshelf: Honey bee medicine

CHRIS PALGRAVE

Following a change in legislation in the US/Canada, all antibiotics that are deemed 'medically important' now require a prescription or 'veterinary feed directive' before they can be used in animals. The veterinary profession in North America, where antibiotics are commonly used in honeybees, has had to play catch-up. In January this year, co-editors Terry Ryan Kane and Cynthia Faux, together with over 30 contributors, including vets, beekeepers and entomologists, published 'Honey Bee Medicine for the Veterinary Practitioner' (Wiley Blackwell). This is a 400-page professional veterinary textbook, covering honeybee biology, husbandry and medicine. It includes applying the principles of 'herd health' to honeybees, a step-by-step guide to examining a colony, performing a postmortem examination on a hive, as well as detailed reviews of the major pests, pathogens and husbandry issues affecting honey bees. Although some of the content is not directly relevant to the UK/Europe, it is a well-written, richly-illustrated, heavily-referenced and comprehensive resource. It is a remarkable achievement, essential reading for any vet seriously interested in honey bee medicine, and a must-have for all vet school libraries.



## The British Bee Veterinary Association

The British Bee Veterinary Association (BBVA) was launched in 2015 in response to an increased demand for bee knowledge and expertise within the veterinary profession. We host multiple educational events each year and attend a number of veterinary conferences. The BBVA also runs the very successful [Bee-Friendly Practice Scheme](#).

For more information on membership or becoming a Bee-Friendly Practice, please visit: [www.britishbeevets.com](http://www.britishbeevets.com) or email BBVA President, John Hill, at: [president@britishbeevets.com](mailto:president@britishbeevets.com).



## Editor: Chris Palgrave

Chris is a beekeeper and veterinary surgeon living with his family in the Exe Valley in Devon. He is a member of [Exeter Beekeepers](#) and writes regularly for the veterinary and beekeeping press, including a monthly column in [BeeCraft](#) magazine. Please send any comments, suggestions or contributions to [buzz@britishbeevets.com](mailto:buzz@britishbeevets.com).





Swap bedding plants for bumblebee-friendly options with our handy list – great for community and gardening groups.



Listen using 'Read Out Loud' in Adobe Acrobat Reader

Pretty bedding plants like begonias and busy lizzies may brighten up our communities, but sadly they offer bumblebees very little or no food.

This is because their flowers have no pollen or nectar, or are the wrong shape for bumblebees to feed on. So lots of public flower displays in fact leave bumblebees and other pollinators hungry!

**But it's easy to change that!** These beautiful plants are all bumblebee-friendly, and easy to grow and look after. Get a display which is just as attractive, for the same effort – and you can feel good knowing you've helped bumblebees.



**Top picks – shrubs**



	Flower colour	Plant in	Sunny spot	Partly shady	Flowering time
<b>1 Mahonia</b> ( <i>Mahonia</i> species)	yellow	   			November – March
<b>2 Winter heather</b> ( <i>Calluna</i> , <i>Erica</i> varieties)	purple, pink, white, yellow	   			December – March
<b>3 Rosemary</b> ( <i>Rosmarinus officinalis</i> )	blue	   			March – May
<b>4 Forest flame</b> ( <i>Pieris</i> variety)	white, pink	   			April – May
<b>5 Dog rose</b> ( <i>Rosa canina</i> )	pink, white	   			May – August
<b>6 English lavender</b> ( <i>Lavandula angustifolia</i> )	purple	   			May – September



Spring Summer Autumn Winter



## Common UK bumblebees

The UK has 24 species of bumblebee, some common and some rare! These are the eight most common bumblebees you are most likely to see.

Use this poster to have a go at identifying your local bumblebees. Like all insects, their bodies have three main segments: the head, thorax (upper body) and abdomen (lower body). Looking at the tail colour is the best place to start, then the colour patterns on the rest of the body.

For a step-by-step guide to identifying bumblebees, visit [bumblebeeconservation.org](http://bumblebeeconservation.org)

### Bumblebees listed by colour pattern



### Buff-tailed bumblebee (*Bombus terrestris*)



Queens and males usually have buff tails but workers' tails are largely white, usually with a hint of buff at the front margin. Yellow bands slightly darker/dirtier than in the White-tailed.

Photo: Queen bumblebee by Andrea Finch

Queen Worker



### White-tailed bumblebee (*Bombus lucorum*)



Similar to Buff-tailed bumblebee but tail always pure white and bands brighter yellow. Males have yellow faces and often extra yellow bands.

Photo: Queen bumblebees by Andrea Finch

Queen Male



### Garden bumblebee (*Bombus hortorum*)



A very long-tongued species with a white tail and yellow bands, including one at the rear of the thorax. Has a longer 'horse-like' face.

Photo: Male bumblebee by Andrea Finch

Queen/Worker/Male



### Heath bumblebee (*Bombus jonellus*)



Three yellow stripes and a white tail, similar to Garden bumblebees, but smaller with a short tongue and round face. Males have bright yellow faces.

Photo: Bumblebee worker by Mick Owens

Queen/Worker/Male



### Tree bumblebee (*Bombus hypnorum*)



Recent immigrant from France. Unique brown, black and white colour pattern. This bumblebee has spread rapidly and is now widespread in England, Wales and Scotland.

Photo: Bumblebee worker

Queen/Worker/Male



### Common carder bee (*Bombus pascuorum*)



The only common brown bumblebee. Some forms have a very dark abdomen, but others are very light and similar to rarer carder bees.

Photo: Bumblebee worker

Queen/Worker/Male



### Early bumblebee (*Bombus pratorum*)



A common small bee with an orangey-red tail. Has one or two yellow bands and males have a yellow face. Rarely seen after July.

Photo: Male bumblebee by Gordon Mackie

Queen Male



### Red-tailed bumblebee (*Bombus lapidarius*)



Females are all black, with a red tail. Males have yellow hair on the face and a yellow band at the front of the thorax.

Photo: Queen bumblebee by Jack Reid

Queen Male





# BBVA Webinars



Wednesday April 6th, 8pm

## How to Vaccinate a Beehive

**Dalial Freitak**

[https://us02web.zoom.us/webinar/register/WN\\_DOfWxU7RGGdUbBCWI1\\_gg](https://us02web.zoom.us/webinar/register/WN_DOfWxU7RGGdUbBCWI1_gg)



Wednesday April 13th, 8pm

## The All-Ireland Pollinator Plan:

Encouraging Biodiversity Action  
Across All Sectors

**Úna FitzPatrick**

[https://us02web.zoom.us/webinar/register/WN\\_ojALyxXuTBGRRt3GfarqOA](https://us02web.zoom.us/webinar/register/WN_ojALyxXuTBGRRt3GfarqOA)



Wednesday April 20th, 8pm

## Honey Bees Fighting Back

Against Varroa

**Stephen Martin**

[https://us02web.zoom.us/webinar/register/WN\\_uFLX8SGtQJW7oBaVQ8Xvfg](https://us02web.zoom.us/webinar/register/WN_uFLX8SGtQJW7oBaVQ8Xvfg)

Sponsored  
by



# BBVA Webinars 2022

Wednesday April 6th, 8pm

## How to Vaccinate a Beehive

Dalial Freitak

Honeybees are the most managed insect species on Earth and essential for our way of life. Despite the enormous importance of bees, they do not benefit from preventative health care methods, like vaccination, used in other agriculturally important animals. Dalial will outline how, despite honeybees lacking antibodies, there is a hope that we can design vaccines for them. These will help us to keep our pollinator populations healthier in the future.

Wednesday April 13th, 8pm

## The All-Ireland Pollinator Plan: Encouraging Biodiversity Action Across All Sectors

Dr Úna FitzPatrick

One third of our 99 wild bee species are threatened with extinction from the island of Ireland. In publishing the first All-Ireland Pollinator Plan in 2015, Ireland became one of the first countries in Europe to address this issue in order to ensure the sustainability of our food, avoid additional economic impacts on agriculture, and protect the health of the environment. The first phase of the Plan has been very successful and has led to positive changes across all sectors. It is a shared plan. By together taking simple evidence-based actions, we can better protect our biodiversity. As we implement the second phase of the Pollinator Plan for 2021-2025, this talk will explore the lessons we have learned and will explain the many positive ways that you can help in the coming years.

Wednesday April 20th, 8pm

## Honey Bees Fighting Back Against Varroa

Professor Stephen Martin

Since the arrival of the Varroa mite from Asia, millions of honey bee colonies have died. For decades, beekeepers have continued to control Varroa populations by the use of chemicals and other invasive methods. However, throughout Africa and most of South and Central America mite-infested colonies survive without any form of mite-control. This has been linked with poor mite reproduction, although what causes this has remained unknown. Throughout, Europe the USA and Wales an increasing number of naturally evolved, mite-tolerant colonies are being discovered. The talk will discuss the various tolerant mechanisms and how honey bee populations in Brazil, Cuba, Africa, USA and UK all appear to have evolved similar ways to combat the Varroa mite.

Sponsored  
by

