THE IPSWICH & EAST SUFFOLK BEEKEEPERS' ASSOCIATION

First Founded 1880; Registered Charity 1158794

Newsletter for January - April 2016

Queen colour is white

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Opinions expressed in this Newsletter are not necessarily either those of the Editor nor of the Association.

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Please help new beekeepers become skilled ones!

Our Association has an apiary off Humber Doucy Lane, just off the Ipswich to Tuddenham road. It has been run principally for honey. Your committee would like to use it for teaching - at all levels - not just beginners. This is, I think, a long felt need. We were all beginners once. We can all improve - through education, education and more education! If we are to make it a reality, it will have to be a whole Association effort. It would be really great if many of our more experienced members volunteered. If we have enough, no one would have to come more often than once a month. If you think you might be able to help, please tell me: 01473-737700 or JeremyQ@tiscali.co.uk.

East Anglian Bee Forum

This is an excellent annual briefing organised by our Regional Bee Inspector, Keith Morgan, and takes place in September each year; this year on 16th.

Bee Health Policy. Mike Brown, Head of DEFRA's National Bee Unit said that with the globalisation of trade, the work of the bee inspectorate was shifting towards exotic threats. It is hoped that these may be forestalled by monitoring apiaries within 5 km of ports, airports, truck transport depots, etc. That the risks are real has been demonstrated when an aircraft came in from Chad via several other places with a swarm - this had withstood temperatures down to -55°C; it was killed; examination showed it was carrying varroa. An *Apis florea* colony found its way to South Africa in machinery; there are many other examples. The Eastern Region has a particularly high number of exotic pest risk points.

The Healthy Bees Plan (England & Wales) and the Bee Health Advisory Forum both aim to get everyone working together to promote good standards. The NBU is now a part of government's broadening focus on other bee pests and diseases, not just foulbrood. Much work has been done on contingency planning based on comprehensive pest risk analyses. The bigger the potential damage, the more resources are available. In the EU, a centre of excellence has been established at ANSES, the French national Agency for Food, Environmental and Occupational Health & Safety. Bee farmers in the DASH scheme are now able to conduct their own inspections. New animal health legislation will include honey and bumble bees.

In many EU countries, it is the law that beekeepers must register. In England (and Wales), we want beekeepers to sign up on BeeBase; encouragingly, the number registered is recently well up. The work of the NBU is science led. We have established sentinel apiaries close to likely invasion points; their selection has been stress tested. The spread of disease has been modelled so allowing us to predict how an infection will spread.

Making ready for possible invasions means knowing the parameters for survival, investigating how we will deal with them, should they ever come. Biological and chemical control might make use of nematodes, entomopathogenic fungi, alternative pesticides and novel approaches. The NBU's publications cover what could and should be done. These include: Cuthbertson et al (2013): the Small hive beetle, *Aethina tumida*: a review of its biology and control measures. [Current Zoology, 59: 644-653.]

Bee Base. Beekeepers registered were: 2007, 14,461, 2014, 35,386 with more than 165,000 apiaries. In 2014, one third of all inspections, some 6,800, were for exotic pests, rather than inspecting all within a 3 or 5 km radius. They were made by 60 part

time and 9 full time inspectors. We made some 8,000 fewer inspections; this was due partly to the disruption of our transfer to APHA, so it took longer to fill vacancies for SBIs, and partly because exotic threat inspections must be thorough so took longer.

Small Hive Beetle

As you know, this was discovered in Reggio Calabria, on the toe of Italy, in September 2014. This is an area where there are orchards and much trade; fortunately, it was found in a university apiary where standards are good. It was not seen in August inspections but a month later, it was evident. In other words, it was found early so the Italian authorities decided upon eradication. It was found in 61 apiaries in Calabria and one in Sicily that had returned from Calabria. The area favoured this decision with the sea on one side and a ring of mountains on the other. Again fortunately, the winter of 2014/5 was one of the coldest on record. 3,500 colonies were destroyed by burning; the soil was treated with two different pesticides and rotovated. The Italian government paid compensation. So far, he said, no beetles have been found in 2015.

After meeting note: Small Hive Beetle adults and larvae were found in Italy on 16th September within the 20km protection zone.

There is a very short 'window' in which eradication may be possible - perhaps 2-3 months. The Italians had geography and the weather on their side; if SHB had been found in London, where there are 5,000 apiaries within a 20 km radius, it would have been impossible to do the same. No decision has yet been made whether to go for eradication or acceptance. In the UK, compensation is unlikely.

An IBRA report details what is known about the beetle. It can fly 10 km; larvae survive 100 days without food; it needs 24 hours @ -12°C to kill it. Adults lay some 2,000 eggs apiece and, using long ovipositors, tuck them into cracks and crannies where the bees cannot reach them. Larvae emerge 3 weeks later. The beetles are ⅓ the size of a bee, are found everywhere in hives and don't like light so scuttle away when colonies are opened; in other words, if they are present, they are easy to see.

We have been fortunate that Dan Etheridge, a Seasonal Bee Inspector, has lived in the States and has experience of the SHB which he has passed onto the NBU. In Georgia successful control has been found possible using traps between frames and on floors that beetles can enter but bees cannot. It has been found essential to keep colonies away from trees, perhaps because the beetles can also exist happily on fruit, their original food. A five frame nuc is the minimum size that has enough bees to defend itself; Apideas can't be used. Extraction must be carried out as soon as the supers are removed. Supers can be safely stored in refrigeration but then must be re-warmed before spinning. Clemson University, South Carolina, publishes good guidance. In Australia, 'Chux superwipes' have been found to make effective beetle traps.

Asian Hornet

It is now in France, Spain, Belgium, Portugal, Italy and Germany; also in South Korea. Queens emerge in the spring and raise a few workers. When a good food source is found, the colony relocates to within 1-2 km of that and then grows large. Honey bees form some 50% of their diet. Hornets 'stack' outside hive entrances at different levels. They do not enter colonies but 'hawk' outside them, catching returning foragers on the wing. This inhibits foraging! Commonly, there may be 10-12 nests per km^2.

In France, it is the responsibility of the commune to deal with nests but this can be expensive. In October 2014, NBU pest control and Wildlife teams visited Andernos-les-Bains, a small town near in Bordeaux. The hornet has had a devastating effect; beekeepers are reporting honey harvests going down from 50kg to 10kg. To fight it, they employ a 'cherry-picker' and half a man's time. Nests cannot be tackled in daylight but at dawn, adding difficulty. When first encountered, there were 4 nests in the area; last year there were 100. In France, because sulphur dioxide is used in the wine trade, it is available, but it could not be used here. There, it is injected into a nest using a lance, a far from easy task in semi gloom; it adds to the difficulty that 20% of nests are above 20 metres, one was 28 m high.

Beekeepers fit porches to hive entrances with vertical wires @ 37 mm intervals to deter the hornets. The rate of predation is such that, where there are hornets, beekeeping may become impossible.

The local population notice the hornets which are everywhere a nuisance. This hornet is now all along the north French coast; it can only be a matter of time before it reaches us.

Dr Katherine Roberts, FERA

Katherine is the successor to Giles Budge. She explained that FERA is a now a noun, no longer an acronym, and the name of the agency owned 75% by Capita and 25% by DEFRA. She went on to outline some of the projects now underway. These are:

SmartBees

This is a 5 year EU scheme for the "**S**ustainable **Ma**nagement of **R**esilien**t** **BEE** populations" that aims to understand natural resistance mechanisms - particularly to Varroa and DWV by:

1. Discovery of resistant traits and genes.
2. Advance knowledge transfer to beekeepers.
3. Field test traits to test local bee breeding.
4. Dissemination through publications & organisations.
5. Enhance resistance through dietary regime.

Among many other things, it means to establish a standard method for counting bees. See: http://www.smartbees-fp7.eu/Extension/index.html. Take the survey (mostly about bee breeding and where you get your information): https://www.netigate.se/a/s.aspx?s=216996X32424011X22443.

Varroa culture. A Veterinary Medicines Directorate project. Varroa is a highly reliant on its host and the VMD is funding the investigation of the volatiles the bee larvae emit that the varroa target.

MLST. Multi locus sequence typing of foulbroods - an aid to understanding disease spread. EFB and AFB strain types will be uploaded onto BeeBase to help inspectors understand and link disease spread.

Stress testing and optimisation of early interception networks for invasive pests of pollinators - based on our work on AFB in Jersey.

Arsenophonus. Friend or foe?
After meeting note: according to Wikipedia, "Arsenophonus is a genus of Enterobacteriaceae, of the Gammaproteobacteria. Arsenophonus are an increasingly discovered symbiont of insects from a diversity of insect taxa. Arsenophonus species are usually male-killers or mutualistic endosymbionts. *Arsenophonus nasoniae* infects the Nasonia parasitic wasps."

Varroa. There is no sign of Varroa slowing down.

I&ES BKA SUBSCRIPTION RATES FOR 2016

Registered (Ordinary) Member	£27.00
Partner Member	£18.00
Country Member	£14.50
Junior Member	£17.00

These rates reflect the increase in the BBKA Capitation fee. If a Registered and Partner Member work together, only 3 hives will be covered by disease insurance as Partner Members do not pay the basic BDI insurance so any extra hives will need to be paid for under the "additional colonies" section of the subscription form.

You can still subscribe to the paper copy of BeeCraft – £25.20, if paid before 15 February 2016. However, if you would only like the digital copy, this will be £16.60.

The subscription form can be found on the website, www.suffolkbeekeepers.co.uk under the Ipswich button. As usual, if you have not paid your subscription by 31 March 2016, there will be a 40 day delay on the start of your BDI insurance cover. **PLEASE NOTE** – I shall not be arranging for BDI receipts to be sent out until I have confirmation from the bank that you have paid online or I have received your cheque/monies!

Do not forget to tick the swarm box if you are willing to collect swarms – this is for the list that goes to the police, pest control companies, environmental health departments etc. in Suffolk. If you wish to be on the BBKA website for swarm collection, please contact Ian McQueen, the County Secretary, on secretary@suffolkbeekeepers.co.uk

As the I&ES BKA is a charity we are able to claim Gift Aid so, if you are a tax payer, please tick the appropriate box on the subscription form.

We have changed the part of the form that deals with Bee Health to an opt out tick box – only tick the box if you **DO NOT** wish to have your details given to the National Bee Unit

Hoping you all have a good beekeeping year

Jackie McQueen, Treasurer

- - - For sale! - - -

John Fairhurst & Annette Whitaker are scaling down so have colonies for sale @ £150 in Nationals or Commercials with one super. annettew38@hotmail.com; 01394 460415.

Bev Rogers offers a colony in National brood & a half aerotech@globall.com; 07968 481864. @ £100.00.

Julie Clinch offers colonies in Nationals with supers @ £140.00; clinchmob@talktalk.net.

Modified National Hives complete + stand £90.00 each Fred Willis, The Acreage, Grayson Avenue, Pakefield, NR33 7BB; 01502 586511; frederickwillis@btinternet.com.

Honey jars £19.00 for 72; see Fred Willis's details above.

Cræftiga: Sutton Hoo Festival of Craftsmanship

Wanted - two people to promote bees and beekeeping on Sat 9 & Sun 10 April. The two who went last year enjoyed the event but can't make it in 2016. Could you help? Details from: laura.howarth@nationaltrust.org.uk; 01394 389700. Please let Jeremy Quinlan know if you can help.

Field Studies Council courses at Flatford Mill, East Bergholt Contact

13-16 May: Wild Flower Identification: Top 20 Flower Families
20-23 May: Identifying Bumblebees
27-30 May: Wild Flower Identification: Top 20 Flower Families
3-5 June: Introducing Beekeeping
15-22 July: Solitary Bees: Identification and Ecology
5-8 Aug: Identifying Plants: Using Botanical Keys with Confidence
9-11 Aug: Wildflower Identification for Absolute Beginners

British Association of Nature Conservationists

Are you passionate about nature conservation? Are you looking for a community that shares your interest? www.banc.org.uk; www.banc.org.uk/ecos/ecos-archive

A Christmas or a Harvest supper? And where?

24 came to our Christmas Supper in December. It was an excellent meal (good value for £14) and, judging by the noise, all much enjoyed it. But there were 30 last year and even 30 aren't many from a membership of 206. The period before Christmas can be busy, would more come to a Harvest Supper?

One member remarked: "It's one of my favourite times of year and because we produce a lot of vegetables and I make lots of preserves, the whole concept of harvest festival is one I personally find very appealing. I like the idea of everyone bringing the fruits of their harvest and sharing."

Is Dallinghoo too much 'out on a limb'? The 'centre of gravity' for members might be Belstead; would shifting it there or somewhere nearby encourage more to come?

Please let the Committee know your views.

"Honey bee" or "honeybee"?

In the preface of his 1956 classic *'Anatomy of the Honey Bee'* the great American entomologist Robert E. Snodgrass explains the book's title. First, it must be explained why the name of the bee appears in the title as two words, though "honeybee" is the customary form in the literature of apiculture. Regardless of dictionaries, we have in entomology a rule for insect common names that can be followed. It says: If the insect is what its name implies, write the two words separately; otherwise run them together. Thus we have such names as house fly, blow fly, and robber fly contrasted with dragonfly, caddisfly, and butterfly, because the latter are not flies, just as an antlion is not a lion and a silverfish is not a fish. The honey bee is an insect and is pre-eminently a bee; "honeybee" is equivalent to "Johnsmith."

"Superbees" mystery solved!

The mystery of the apparently Varroa-resistant honeybees in a UK apiary has been solved, and the answer has been a real surprise.

Over the past few years there have been dramatic headlines about what seem to have been Varroa-resistant honeybees in the apiary of a beekeeper in Swindon, England (not far from Vita's HQ). Ron Hoskin's bees have been dubbed "super bees" and it was thought that their hygienic behaviour was the reason for their success.

However, new research presented by Catherine Thompson of Salford University at the UK National Honey Show and now published in The ISME Journal has revealed the reasons for Hoskin's bees' success. A non-lethal form of Deformed Wing Virus (DWV) is prevalent amongst his bees and is acting to exclude the more lethal form.

DWV is now well-known as a killer of honeybees and its virulence seems at least in part to have been caused by Varroa which, because it injects the virus straight into the bees' bloodstream, has spread the virus with disastrous effects. Honeybees have long had DWV but, pre-Varroa, spread by sex and other methods had not enabled it to spread so quickly and thoroughly throughout a colony.

For reasons that are not yet understood, Hoskin's bees have been subject to a relatively benign version of DWV -Type B. In contrast DWV Type A is lethal. Type B has become dominant in Hoskin's apiary and kept Type A out - or at least to very low levels. It is even thought that Varroa spreading Type B have in effect inoculated the bees against Type A!

Unfortunately, simply moving Hoskin's bees to another apiary where DWV Type A is dominant is likely to be futile. The colony is likely to be swamped by the lethal Type A and face the disease threat common to most colonies.

Nonetheless, it is hoped that this exciting new finding may eventually help in some way to produce a break-through in helping honeybees. From the Vita website.

BDI ReViVe Project

I am delighted to tell you that the call for funding of the ReViVe project to investigate how to replicate the ability of some colonies to survive and indeed co-exist with varroa without being affected by deformed wing virus has been successful.

To date just over £100,000 has been committed over a three year period, from BDI, the CB Dennis Trust and most importantly local associations such as yours to fund this research. BDI has been very encouraged by our member associations' willingness to engage with this specific research project which has, with the other funding sources, enabled it to go ahead. The total raised is a slightly short of the overall project budget, but we are aware of some associations that have not yet considered the proposal and we are confident the final total will be met.

Martin Smith, President, Bee Disease Insurance Ltd

The I&ES BKA commitment is £300 a year for three years. BDI will give associations which have funded the project regular updates; the first will be after their AGM on Friday 8 April 2016 at the BBKA Spring Convention.

Excellent videos of National Honey Show talks
https://www.honeyshow.co.uk/lecture-videos.php

Critics of ban on bee-harming pesticides are sowing confusion

Recent harvests suggest that the European Union's ban on neonicotinoids isn't proving a disaster for farming, says biologist Professor Dave Goulson.

Amid growing evidence that neonicotinoid pesticides harm bees, in 2013 the European Commission announced a moratorium on their use on crops that attract these insects. The UK was in the minority of countries voting against. Perhaps the government was swayed by glossy reports funded by the agrochemical industry, declaring that the ban would slash crop yields and cause huge job losses. One such document states that if the moratorium went ahead, in five years the European Union could lose at least €17 billion, 50,000 jobs could go, and "more than a million people engaged in arable production… would certainly suffer". We can start to evaluate this claim now that we are in the second year of the moratorium - keenly watched by the US, which has so far resisted calls for a ban.

Crops sown in spring 2014, mainly sunflower and maize, were the first not to have the pesticides applied. Across the EU, their yields were higher than the five-year average, in some regions more than 25 per cent higher. So the predicted devastation starts to look like hot air, although we shouldn't base too much on one year's data.

Debate in the UK has focused on oilseed rape. Here it is mainly autumn-sown, so the first neonicotinoid-free crop wasn't in the ground until August 2014, and is being harvested now. However, the UK's National Farmers Union (NFU), which opposes the ban, pointed to Sweden and said that up to 70 per cent of spring-sown oilseed there had been wiped out by pests. As it turned out, it was down 5 per cent overall.

The NFU also highlighted a claim that on some UK farms up to half of the autumn crop was being lost to flea beetles. Recent figures show that overall 3.5 per cent of the sown area was lost. But remember that some crops are lost every year, even with neonicotinoids.

Although the final yields are not yet available, projections for this crop are promising across Europe. In the UK, yield forecasts are also good and harvest figures so far, back this up, suggesting final yield is set to top the 10-year average.

In highlighting losses, the NFU was attempting to garner support for an application to allow UK farmers to ignore the ban. This has now been approved for a limited part of southern England, despite a 400,000-signature petition opposing it. So why was it approved? Getting an answer is hard. The NFU's case is being kept secret on the grounds that it is "commercially sensitive".

That means we cannot see why environment secretary Liz Truss decided some farmers could again use chemicals that the European Food Safety Authority says "pose an unacceptable risk to bees". *New Scientist - 15th August 2015*

See Professor Goulson's lecture to the Linnean Society: "Bees, Pesticides & Politics".

Reconciling laboratory and field assessments of neonicotinoid toxicity to honeybees

European governments have banned the use of three common neonicotinoid pesticides due to insufficiently identified risks to bees. This decision is controversial because, although laboratory trials report deleterious effects to honeybees at trace levels, field surveys reveal no decrease in the performance of honeybee colonies in the vicinity of treated fields.

Here we provide the missing link, showing that individual honeybees near thiamethoxam-treated fields do indeed disappear at a faster rate, but the impact of this is buffered by the colonies' demographic regulation response; they produce replacement workers rather than drones.

Although we could ascertain the exposure pathway of thiamethoxam residues from treated flowers to honeybee dietary nectar, we uncovered an unexpected pervasive co-occurrence of similar concentrations of imidacloprid, another neonicotinoid normally restricted to non-entomophilous crops in the study country. Thus, its origin and transfer pathways through the succession of annual crops need be elucidated to conveniently appraise the risks of combined neonicotinoid exposures.

This study reconciles the conflicting laboratory and field toxicity assessments of neonicotinoids on honeybees and further highlights the difficulty in actually detecting non-intentional effects on the field through conventional risk assessment methods.

Mickaël Henry, Nicolas Cerrutti, Pierrick Aupinel, Axel Decourtye, Mélanie Gayrard, Jean-François Odoux, Aurélien Pissard, Charlotte Rüger, Vincent Bretagnolle. Proc. R. Soc. B 2015 282 20152110; DOI: 10.1098/rspb.2015.2110. Published 18 November 2015

Effects of Oral Exposure to Fungicides on Honey Bee Nutrition and Virus Levels

Sub lethal exposure to fungicides can affect honey bees in ways that resemble malnutrition. These include reduced brood rearing, queen loss, and increased pathogen levels. We examined the effects of oral exposure to the fungicides boscalid and pyraclostrobin on factors affecting colony nutrition and immune function including pollen consumption, protein digestion, haemolymph protein titres, and changes in virus levels.

Because the fungicides are respiratory inhibitors, we also measured ATP concentrations in flight muscle. The effects were evaluated in 3- and 7-d-old worker bees at high fungicide concentrations in cage studies, and at field-relevant concentrations in colony studies. Though fungicide levels differed greatly between the cage and colony studies, similar effects were observed.

Haemolymph protein concentrations were comparable between bees feeding on pollen with and without added fungicides. However, in both cage and colony studies, bees consumed less pollen containing fungicides and digested less of the protein. Bees fed fungicide-treated pollen also had lower ATP concentrations and higher virus titres. The combination of effects we detected could produce symptoms that are similar to those from poor nutrition and weaken colonies making them more vulnerable to loss from additional stressors such as parasites and pathogens.

Degrandi-Hoffman et al; USDA-ARS, Carl Hayden Bee Research Center, 2000 East Allen Rd., Tucson, AZ 85719. First published online: 28 August 2015

Do (some) bees need fungi to survive?

https://www.youtube.com/watch?v=d8Nzs3GkfoA&sns=em

CHARLIE DANSEY

Charlie passed away in St. Helena Hospice, Colchester, on 25th of September aged 76 after battling inoperable lung cancer.

Charlie was a very active beekeeper who began 37 years ago. He never lost his enthusiasm for the hobby that he loved so much, sharing his knowledge with beginners, taking classes, giving talks to various associations and attending committee meetings.

In earlier times, Charlie exhibited honey and candles at the National Honey Show and took part in local honey shows, exhibiting and selling his honey and beeswax candles. He was particularly proud of his 'orange' queens and maintained the line for many years

But what gave him the most pleasure was watching his bees coming back to the hives with many different colours of pollen on their legs and the wonder of where it had all been collected.

With the help of his daughter, Julie, Charlie looked after his bees until almost the end of his life – he will long be remembered.

Farm wildflowers & neonicotinoids

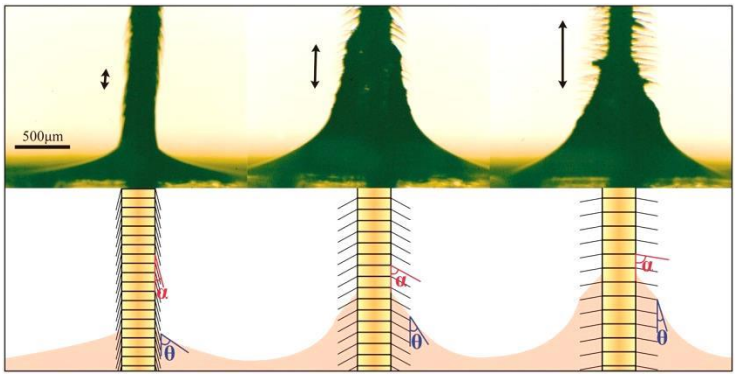
Because many flowering plants grow naturally on farms, and farmers often sow wildflowers near fields to attract pollinators, researchers analysed pollen samples from wildflowers growing in areas close to arable fields and from beehives on five farms in the U.K. They found that pollen from wildflowers growing in these locations often contains neonicotinoid residues. In addition, 97% of neonicotinoids in the pollen that bees brought back to honey bee hives was from wildflowers. They say that neonicotinoids are likely leaching through the soil and being taken up by the wildflowers.

The above is reprinted from materials provided by American Chemical Society, October 21, 2015.

The Bee Coalition

This organisation lobbied Members of Parliament before the Westminster Hall debate on pesticides and pollinators on 7th December. See details here. I was interested to see that its members are: Buglife, Client Earth, Environmental Justice Foundation, Friends of the Earth, Natural Beekeeping Trust, Pesticides Action Network UK, Royal Society for the Protection of Birds, Soil Association, Scottish Wildlife Trust, The Wildlife Trusts.

Wettability of the honey bee's tongue surface varied at will



The erection angle of glossal hairs dynamically alters the glossal surface and wettability in foraging activities, not only reducing the energy consumption for impelling the nectar during tongue protraction, but also improving the nectar-trapping volume for feeding during glossa retraction. *Ji Chen, Jianing Wu, Shaoze Yan DOI: http://dx.doi.org/10.1093/jisesa/iev143 164 First published online: 7 December 2015*

A winter's tale

While you were tucking into your turkey and Christmas pud, did you stop to think about the bees in your hives? In the middle of winter we tend to forget about them, but those bees are the most important group of bees that will ever live in your apiary and on them depends the existence of the colonies and the success, or otherwise, of next summer's beekeeping.

In late summer and autumn the queen continues to lay, although at a reduced rate. The bees that develop from these eggs will have a lower metabolic rate and little work to do as there are fewer larvae to feed and the available forage is meagre.

As a result of this they remain 'young' and do not follow the normal pattern of development and aging which we see throughout the summer when, approximately 3 week old bees graduate from in-hive duties to foraging and, as a result, age and die in about 2 – 3 weeks.

It is important to realise that the aging process in a bee switches when that bee becomes a forager. At that point in its life, a number of changes take place: its protein levels drop, its Juvenile Hormone (JH) levels rise and it is then on the slippery slope to death.

Our winter bees do not make this transition at 3 weeks, but continue in their physiologically young state until the spring, when they kick-start the massive colony growth which precedes the swarming season.

So, how do they prepare for this lifestyle? All newly-hatched workers eat nectar/honey and large quantities of bee bread, which is stored, fermented pollen. The honey provides the carbohydrate in the diet but the pollen contains large amounts of protein plus some fat, minerals and vitamins, and is used to manufacture brood food in the mandibular and hypopharyngeal glands of these young bees so that they can feed larvae.

Young winter bees also consume large quantities of bee bread but they do not use it immediately. Instead, much of it is stored in their fat bodies. These are important as substances, including enzymes and other proteins. They are spread throughout the body of the bee, principally in the roof and on the floor of the abdomen where they appear as masses of white cells. Well fed, winter bees have abundant fat bodies.

One of the principal stored proteins is vitellogenin, and quantities of this are also stored in the hypopharyngeal glands, which remain plump. In the spring, as new larvae need food, all this stored protein is converted into brood food. With their protein reserves depleted, our winter bees become foragers, the aging process starts and they die.

What goes wrong? Disease is the biggest problem. Varroa has been shown to change the physiology of the winter bees so that they do not store adequate protein, but the main effect of all adult bee diseases is to shorten the life of the infected bee.

Varroa, Deformed Wing Virus (DWV) and Nosema, our 3 main culprits, can have a devastating effect on the colony, killing many of the winter bees before the spring bees can build up sufficient numbers to take over.

This leads to the classic situation of colony deaths in February and March. Colonies can also die then if they run out of stores of honey, as the increasing population of young bees in the colony puts greater demands on the available stores.

This is all of practical importance to us as beekeepers. The winter bees must be protected by ensuring that they do not suffer from high levels of Varroa during their development.

This means treating early, as soon as the honey crop can be removed in August, if Varroa numbers have not been controlled by husbandry means during the active season.

It may present particular problems for those taking bees to the heather, as any treatment applied after the return of these colonies will be too late to be effective. They need to go on their travels with low Varroa counts. Controlling Varroa to keep it below the 1,000 mites/colony level will also control the viruses, particularly DWV.

Nosema has to be monitored and controlled during the spring/summer by testing the colonies and getting them onto new comb if necessary. There is no chemical treatment available.

Progress can be made by breeding from colonies not showing the disease and removing those queens which are susceptible.

Finally, and very importantly, colonies need good supplies of pollen during the later part of the summer so should be sited where sources are available. (The use of pollen supplements or substitutes is debatable.) There is of course, no excuse for colonies dying of starvation and every effort should be made to supplement stores of honey if necessary in September.

Celia Davis, Warwickshire Beekeepers, via eBees

Quantum Biology

Life on the Edge: The Coming of Age of Quantum Biology

A book by Johnjoe McFadden & Jim Al-Khalili

'Quantum Biology' is looking for phenomena within living organisms that we would not be able to explain without appealing to the weird counter-intuitive world of quantum mechanics.

For example, enzymes - we now know that these workhorses of the living cell that speed up biochemical reactions are only able to do their job because they can transport sub atomic particles, electrons and protons, from one place to another very quickly with the help of 'quantum tunnelling' - they just wouldn't be able to work without quantum mechanics.

Another example, photosynthesis - one of the most important processes in the whole of biology is as efficient as it is in plants and bacteria because of 'quantum coherence' - the ability of particles and waves to move in different directions at the same time.

Sensing the earth's magnetic field - some birds and insects have an inbuilt chemical compass - they suggest the way this works is due to 'quantum entanglement' - the weirdest concept that two separated particles can interact instantaneously with each other. What they think might be happening here is that in the robin's retina there is a molecule in which a pair of electrons is quantum entangled - they sit on different atoms within this large molecule and they dance a very delicate quantum dance that is sensitive to the direction the robin is facing within the earth's magnetic field. So in whichever direction it is moving, it affects the way these electrons behave sending a signal to the robin's brain telling it which way to fly.

Physicists say anything that's not physics is stamp collecting!

See the TED talk video:

Did you know that many honey bees not only swarm, they also migrate? The whole colony, including the queen, will often fly over twenty miles to relocate to a new source of forage and they may do this twice a year. Honey bees in Kenya relocate from the plains during the dry season and go to the mountain slopes, and then return after the rains when new foliage will have grown on the plains again. [Reigate BKA via eBees]
The giant honey bee, *Apis dorsata,* also does this in India.

Vibrating bees tell the state of the hive

Most beekeepers will have heard of attempts to decypher what the bees are telling each other using microphones but here accelerometers were used.

Researchers from Nottingham Trent University have developed and tested the prototype of a new device that can remotely monitor hive activity without disturbing the bees. The device picks up vibrations from the bees themselves. One common one called a "begging signal" has been used successfully to track changes in bee activity from day to night, and seasonally. The team presented their results at the 170th meeting of the Acoustical Society of America (ASA), held Nov. 2-6, in Jacksonville, Fla.

The scientists embedded two ultra-high performance accelerometers one in the centre of the honeycomb and another 70 mm lower. These continually recorded vibrations in a UK colony for 117 straight days, from July to November of 2014, and in a French one for 170 days, from April to October 2015. The bees used the cells right next to the accelerometers normally, for pollen, brood or honey, so didn't seem to mind them.

[This may be one reason be why bees eat away the comb just above the bottom bars. It would also allow them to vibrate the comb for other signals. - Ed]

Rock the hive

Bees tell each other where food is by performing a dance on the honeycomb. Now, with the help of lasers and strobe lights, scientists have discovered how bopping bees lure their audiences to the dance floor.

A honeybee back from the foraging mission uses a coded dance, including a side-to-side 'waggle', to inform its nest mates about the whereabouts of the food. Soon other bees arrive and copy its moves before flying off to find the booty. "But the complex interaction between honeybee dancers and their followers is far from being understood," according to Jurgen Tautz of Wurzburg University in Germany.

One of the key puzzles is how a dancing bee attracts its audience. Bees often arrive from cells elsewhere in the honeycomb where they couldn't possibly see the dancer, and probably couldn't feel the low-frequency vibrations of the waggle dance over the higher pitched buzz of the hive.

Perhaps the answer lies in the structure of the waxy comb itself? The comb is slightly elastic, so it won't vibrate like a rigid solid. Instead, a vibration radiating from a waggling bee may make the cell walls swing progressively more out of time with each other. . Eventually, there would be what is known as a phase reversal - one wall of a certain cell starts to vibrate in the opposite direction to the other wall. Any bee in the vicinity would feel its feet on either side of its body wiggling in opposite directions - a signal it might not be able to ignore.

To test the idea, Tautz's team simulated the low-frequency vibrations of a waggle dance in a cell of an empty bee hive, and measured the response in other cells with a laser. Sure enough, they found phase reversals in a complex pattern of single cells up to seven cell widths away.

With strobe lights and video cameras, the team also recorded more than 132 dancing bees recruiting 471 followers in an active hive. As Tautz predicted, most of the followers came from a region of the hive where the cell walls were vibrated out of synch with each other. Hazel Muir. From Essex BKA, courtesy BEES.

Plant chemical determines caste

The study reported in the journal *Science Advances* 28 August, 2015, shows that broad developmental changes occur when honey bee larvae - those destined to be workers - are switched from eating royal jelly (a glandular secretion) to a diet that includes honey and beebread (a type of processed pollen).

Beebread and honey contain p-coumaric acid, but royal jelly does not. Queens are fed exclusively on royal jelly. Nurse bees feed the larvae according to the needs of the colony. Experiments revealed that ingesting p-coumaric acid pushes the honey bee larvae down a different developmental pathway from those fed only royal jelly. Some genes, about a third of the honey bee genome, are upregulated and another third are downregulated, changing the landscape of proteins available to help fight disease or develop the bees' reproductive parts.

"Consuming the phytochemical p-coumaric acid, which is ubiquitous in beebread and honey, alters the expression of a whole suite of genes involved in caste determination," said University of Illinois entomology professor and department head May Berenbaum, who conducted the study with research scientist Wenfu Mao and cell and developmental biology professor Mary Schuler. "For years, people have wondered what in royal jelly led to queen development, but what might be more important is what isn't in royal jelly - plant chemicals that can interfere with development."

"While previous molecular studies have provided simple snapshots of the gene transcript variations that are associated with the exposure of insects to natural and synthetic chemicals, the genomics approaches used in this study offer a significantly more complex perspective on the biochemical and physiological processes occurring in plant-insect interactions."

W. Mao, M. A. Schuler, M. R. Berenbaum. A dietary phytochemical alters caste-associated gene expression in honey bees. *Science Advances*, 2015; 1 (7): e1500795 DOI: 10.1126/sciadv.1500795

Guard bees could do better!

We found an average recognition error rate of 14% across 3 study colonies - that is, allowing a non-nestmate colony to enter, or preventing a nestmate from entry, which is lower than reported in previous studies. [Duccio Pradella, Stephen J. Martin & Francesca R. Dani; Chem. Senses (2015) 40 (9): 649-653 first published online September 18, 2015]

Professor Stephen Martin and Dr Ricky Kather, writing in April 2013 about social insect recognition and how Varroa manages to be 'invisible', said that up to 30% of the bees in a colony were originally born in another. It seems that this was an over-estimate.

This, of course, applies only to bees in apiaries. In the wild, colony separations of about a kilometre would help matters. Ed.

Tips for photographing insects

The photographic classes in the honey show actually ask for photos pertaining to beekeeping, a wide field, but there is always a temptation to get that close up of a bee on your biggest hollyhock. Here are some tips from the Nikon web site.

Sony Xperia Phone image

The first basic rule of close-up photography is to get close to the subject. Insect photography requires a macro lens that will allow you to focus very close to the subject. A macro lens lets you photograph your subjects at near life size. Most non SLR digital cameras have a close up (macro) setting denoted by a flower symbol. Mobile phone cameras are capable of taking reasonably detailed close up photos these days - but don't over enlarge the image.

Ideally you should use a tripod to steady the camera, especially when you're using a telephoto lens or long shutter speed. When shooting with your camera on a tripod, using a cable release to trip the shutter is the ideal shooting method. Some photographers will go the added step of locking up the mirror on their D-SLR prior to tripping the shutter. This further reduces the possibility of movement. If you don't have a cable release, you can use the camera's self-timer instead.

Depending on how close you can get, you will be able to fill the frame with the insect's entire body, or a portion of its body such as its head and antennae. Be cautious so you don't get stung. Most insects gathering nectar don't seem to mind a camera (or a photographer) coming close to them. The exception is butterflies. Shooting insects with a macro lens might be dangerous so start with creatures that can't sting you. The shorter the focal length of the macro lens, the closer you will have to be to your subject

Insects have fascinating bodies, and one of the goals of close-up nature photography is to bring out all the colour and detail of insect life. Good macro photography puts the camera's focus on the eyes, legs and bodies of these creatures, and their tiny world. For example, taking a photograph of a spider in its web tells a more interesting story.

Background colour plays an important role in composition. For example, if the subject is dark coloured, as many insects are, a lighter, out-of-focus background will make the creature stand out from its surroundings and focus the viewers' attention on it.

The technique for getting an insect to stand out from the background is to use a shallow depth of field. Depth of field is defined as the area in front of, and behind the subject, that is in focus. Depth of field is determined by the aperture setting. Low f/stops, like f/2.8 will give you a shallow depth of field, which pinpoints the focus on your subject, while the background goes out of focus.

Another technique that nature photographers use is to position their camera so that a brightly lit subject is photographed against a dark background. Exposing for a well-lit subject, under full daylight for example, or with a fill-flash, will cause a dark background to underexpose and approach black. This effect creates a dark, even background, making the subject stand out.

But if the subject and background are both brightly lit, the insect may be difficult to separate from its surroundings. Placing a household item like a piece of cloth or paper behind the subject can work as a portable studio backdrop, isolating the insect against a plain background and setting it apart from its surroundings.

Photo editing programs will allow you to crop your image, and adjust the brightness and contrast. Most cameras will allow you to crop the image and afford some adjustment to brightness and contrast.

Insects are more mobile in warm weather, so photograph them in the early morning or evening when it is cooler, and they will be moving slower. The available light at those times of day will be more flattering too. Placing an insect in a container in the refrigerator or freezer for a short while before taking your photo will slow down its metabolism and make it torpid. Leaving it too long in the freezer, however, will make it dead!

'Eat Natural' invests in honey for new bar

The snack and cereal bar brand Eat Natural is investing £500,000 into new initiatives to boost honey production reported the Daily Telegraph on 9 Dec 15. The company is working with the BBKA to distribute 50 hives, made from the company's damaged pallets, to new beekeepers. They hope to generate between 2 & 3 tonnes of honey in the UK next year so they can launch a new snack bar.

'Just Bee'

A British start-up company selling honey-sweetened drinks is off to a flying start after securing Fortnum & Mason and Selfridges as customers in its first few months in business.

Just Bee, launched by Andy Sugden and Joe Harper in March, secured deals with 20 local businesses in their native Manchester before meeting the buyer from Fortnum & Mason. "It was the perfect place to launch in London because they keep hives on the roof," said Mr Sudgen. Just Bee is the latest entrant into the fast-growing flavoured water market.

National Bee Unit's provisional statistics for 2015

Chronic bee paralysis virus. There has been an increase in diagnosis in the region and in the country. Often beekeepers report deaths. Equally often, it is reported as poisoning.

These bees appear hairless and/or shiny and may be denied entrance to their own colony.

County	AFB		EFB	
	2014	2015	2014	2015
Norfolk	57	4	61	30
Suffolk	0	1	14	2
Essex	6	0	8	3
Herts	0	0	11	1
Beds	0	0	0	0
Lincs	0	1	32	15
Cambs	0	0	1	1
Leics	0	1	0	1
Rutland	0	0	0	0
Totals	65	7	127	54

Exotic pest inspections take longer than the usual ones. See Mike Brown's comment on page 1.

EFB "National League Tables"	
Shropshire	76
Norfolk	30
Dorset	26
E Sussex	26

East Region Statistics	2014	2015
Colonies	27,986	29,944
Beekeepers	5,662	6,058
New beekeepers	545	306
Self-registrations	218	224
Apiary inspections	1,264	964
Colonies inspected	7,925	6,057
Exotic pest inspections	85	368

Will your bees be wimps or warriors?

Summary Even as larvae, honey bees are tuned in to the social culture of their colony and become more or less aggressive according to its temper.

"We are interested in the general issue of how social information gets under the skin, and we decided to take a chance and ask about very young bees that are weeks away from adulthood," said University of Illinois entomology professor and Carl R. Woese Institute for Genomic Biology director Gene Robinson, who led the research with postdoctoral researcher Clare Rittschof and Pennsylvania State University professor Christina Grozinger.

"In a previous study, we cross-fostered adult bees from gentle colonies into more aggressive colonies and vice versa, and then we measured their brain gene expression. We found that the bees had a complex pattern of gene expression, partly influenced by their own personal genetic identity and partly influenced by the environment of the colony they were living in. This led us to wonder when they become so sensitive to their social environment."

In the new study, they again cross-fostered bees, but this time as larvae, in order to manipulate the bees' early life experiences. The larvae were from a variety of queens, with sister larvae divided between high- and low-aggression colonies. The larvae were removed from their foster hives and put into a neutral laboratory environment one day before they emerged as adults. The researchers tested their aggressiveness by exposing them to an intruder bee.

They were surprised to see that the bees retained the social information they had acquired as larvae. Those raised in aggressive colonies were 10 to 15 percent more aggressive than those raised in the gentler colonies. "Even sisters born of the same queen but reared in different colonies differed in aggression, demonstrating the potency of this environmental effect."

The finding was surprising in part because bee larvae undergo metamorphosis, which radically changes the structure of their bodies and brains. "It's hard to imagine what elements of the brain are influenced during the larval period that then survive the massive reorganization of the brain to bias behavior in this way." The aggressive honey bees also had more robust immune responses than their gentler counterparts, the team found. "We challenged them with pesticides and found that the aggressive bees were more resistant to pesticide. That's surprising considering what we know from vertebrates, where stress in early life leads to a diminishment of resilience. With the bees, we saw an increase in resilience."

This finding also suggests that the effects of the social environment on young bees could extend beyond brain function and behavior. The researchers don't yet know how the social information is being transmitted to the larvae. They tested whether the bees differed in size, which would suggest that they had been fed differently, but found no size differences between aggressive and gentle bees. "Adult honey bees are well known for their sociality, their communication skills and their ability to adjust their behavior in response to the needs of the hive. In mammals, including humans, the effects of early life social interactions often persist throughout adulthood despite additional social experiences. A similar pattern in honey bees has broad implications for our understanding of social behavior within the hive and in comparison with other species." [29th October 2015]

US harvesting honey video (30 minutes):
https://www.youtube.com/watch?v=4amHuHnk5XM

Calendar

Members of the six Associations which form the Suffolk Beekeepers' Association are welcome to attend any or all these meetings.
There will be other meetings but details were not available at the time we went to press.

Ipswich & ES BKA **winter** meetings are held in the Scout Hall, Kesgrave IP5 1JF from 7:30pm.

Thu 14 Jan	Barbara Dalby, Apitherapy 7:30pm Hawstead Village Hall	West Suffolk BKA
Thu 14 Jan	Lewis Woolnough: *Beekeeping Microscopy*: Creeting St Mary 19:30	Stowmarket BKA Details
Wed 27 Jan	**Jill Tinsey: *Making the Most of your Beeswax***	**Ipswich & ES Malcolm Marchant**
Wed 24 Feb	**AGM and social**	**Ipswich & ES Malcolm Marchant**
Thu 11 Feb	AGM plus Jeremy Quinlan: Honeybee Democracy	**West Suffolk BKA**
Wed 2 Mar	**Suffolk BKA AGM**; hosted by Waveney Bee Group at Grange Farm Centre NR34 8JN	Ian McQueen 01473 420187
Sat 12 Mar	Cambridge BKA One Day Meeting Chesterton Community College, CB4 3NY	David Abson Details
Wed 23 Mar	**Hasan Mohammad Al Toufailia: *Dealing with Varroa***	**Ipswich & ES Malcolm Marchant**
Thu 24 Mar	How we influence nectar & pollen: Stephen Poyser	Stowmarket BKA Details
Thu 10 Mar	Food Forensics, Norwich: Food Fraud; 7:30pm Hawstead Village Hall	West Suffolk BKA
Fri-Sun 8-10 Apr	BBKA Spring Convention	Harper Adams University TF10 8NB
Tue 12 Apr	*Swarm Control*: 19:30 Creeting St Mary Village Hall	Stowmarket BKA Details
Thu 14 Apr	Doug Brown: 'What has the BBKA ever done for me?'; 7:30 Hawstead	West Suffolk BKA
Sat 23 Apr	General Husbandry Training (2nd session at Easton, 14 May)	Jeremy Quinlan Dallinghoo Details
Sun 24 Apr	**Bee Health Day, Dallinghoo 10:00 - 4:00**	**Ipswich & ES Jeremy Quinlan 01473 737700**
Wed 27 Apr	**Sandra Gray, SBI: *The 2015 season & NBU updates***	**Ipswich & ES Malcolm Marchant**

American Foul Brood

Don't think it can never happen to you! There was a recent case very near Woodbridge.
Interestingly, I learn from the Aussie Beekeepers' Association of the ACT October 2015 Newsletter, New Zealand is attempting to eradicate AFB within the country. See: http://www.afb.org.nz/ - this includes an identification module from which we can all learn.

Native Dark Bees of Scotland

https://scotlandsnature.wordpress.com/2015/10/07/from-beinn-eighe-to-bees
Lots of good stuff here!

Ground almond & semolina honey cake

175g Flour – self raising
25g Ground almonds
25g Semolina
100g Honey - runny
2 eggs - medium
113g butter – soft
Pinch of salt
Preheat oven to 180°C
Cream the butter and honey together.
Sift flour, salt, ground almonds and semolina together.
Beat eggs well and add them / stir into the creamed mixture alternately with sifted dry ingredients.
A little milk may be added if necessary to obtain the correct consistency - the mixture should drop off the stirring spatula leaving a triangular 'stalactite' some 3" long.
Put into lined buttered circular baking tin and bake for approx 1½ hours. [With thanks to whoever's recipe this is!]

Forage loads affect bees' flight stability and manoeuvrability

Bumble bee *[and honey bee]* foragers spend a significant portion of their lives transporting nectar and pollen, often carrying loads of more than half their body mass. Whereas nectar is stored in the abdomen near the bee's centre of mass, pollen is carried on the hind legs. We examine how load position changes the rotational moment of inertia in bumble bees and whether this affects their flight manoeuvrability and/or stability. We applied simulated pollen or nectar loads of equal mass to *Bombus impatiens* bumblebees and examined flight performance in a wind tunnel under three conditions: flight in unsteady flow, tracking an oscillating flower in smooth flow, and flower tracking in unsteady flow. Using an inertial model, we estimated that carrying a load on the legs rather than in the abdomen increases a bee's moment of inertia about the roll and yaw axes but not the pitch axis. Consistent with these predictions, we found that bees carrying a load on their legs displayed slower rotations about their roll and yaw axes, regardless of whether these rotations were driven by external perturbations or self-initiated steering manoeuvres. This allowed pollen-loaded bees to maintain a more stable body orientation and higher median flight speed in unsteady flow but reduced their performance when tracking a moving flower, supporting the concept of a trade-off between stability and manoeuvrability. These results demonstrate that the types of resources collected by bees affect their flight performance and energetics and suggest that wind conditions may influence resource selection.
Mountcastle et al, University of Illinois at Urbana-Champaign; July 2015

Honey Show at the 2016 Suffolk Show

Sue Horrex, a Stowmarket member, has accepted the task of running this on behalf of all members of the Suffolk Beekeepers' Association.

As she will be starting without any direct experience of running the Show, she has quite a hill to climb. We wish her well.

It would help the Show go really well if we all resolved to enter at least one class. If you have no honey or wax, there are all the cooking classes. The time to think about it is **now**! Please, please do!