



Beetalk December 2024

General info and news about bees

Hello and welcome.

Beetalk is a compilation of news from across the bee keeping world.

Its not affiliated to any beekeeping group so you wont get things like the next meeting and what we are doing and such like.

We hope that the articles provided will be useful to anyone interested in the a rewarding hobby and in some way we also hope that you may gain some pleasure in reading some of the article that are included.

Also we intend to include articles that may be helpful to anyone new to the hobby.

Being based in Lancashire it would be great for any contributions from Beekeepers from the county. But as stated above, please nothing about your association or group.

Hope you enjoy.

Michael Birt

Editor

If you have any articles that you think may be useful to have included in Beetalk.

Please e-mail them to the editor

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at

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Bill Ainsworth

Just to let everyone know that my mentor from many years ago who became my lifelong friend passed peacefully away on Sunday 3rd Nov 2024. Aged 94 and a half.

Bill was for many years the Chairman of what was Blackburn and District Beekeepers Association which is now East Lancs Beekeepers Association.

He was the editor of BeeTalk along with Arthur Bickerstaffe for well over 10 year and the information that when into the 4 times a year book was a valuable asset not only to the association but to beekeepers the world over. It was an pleasure and honour to take over from these 2 lads which I continue to day.

He was a beekeeper from being a young man until a few years before his passing and was more a practical beekeeper than an academically one. I am not just saying this but in all honesty Bill had forgotten more than what most people know about how to keep bees, and that is saying something.

I will always remember Bill as a gentle soul. He had particular interest in new and inexperienced beekeepers and it was a joy to watch him teach these newcomers . His patience was remarkable, which is more than I can say about others.



I know time moves on and losses like the bees are inevitable, but, Bill you were one of a kind that are now lost forever.

Here is a little poem that I think fits.

A poem for Bill My mentor and friend

Before leaving, I would like, dear Bill , to carve your name upon these leaves, the blessed shrub that has taken all its sap from around your dwelling place.

In its shade, dear Bill, you have rested from your weariness, have healed your wounds. Its horizon satisfies your desires for there you can see the heavens.

Its solitude is more gentle than deep. Your friends the bees are visiting it. They enliven it with their singing.

And because you do not die, dear Bill , you will sing again and for ever, in the surrounding foliage, your spirit will rest.

Calibrating Your Refractometer

Have you wondered how accurate your refractometer is ?

Here's a simple way to check. Due to the remarkably consistent properties of Extra-Virgin Olive Oil, one drop of it on the slide will always read between 71 and 72 on the 'Brix' scale – the middle one in most refractometers. If you set the lock-nut to show any such oil at 71.5, you will have correctly calibrated the neighbouring scale at the same time.



Is honey the Holy Grail after antibiotics?

Recently, it has been discovered that a previously unknown group of thirteen different beneficial bacteria reside inside the honey crop of bees. They are probably the reason why the nectar is not spoiled in the hive. This group seems to be a Holy Grail of evolution, since the research indicates that these bacteria act as a barrier against unwanted microorganisms.

Beneficial bacteria

- ◆ Lactobacilli and bifidobacteria are included in a bacterial group called the lactic acid bacteria (LAB) as they produce lactic acid as their main end product. LAB are widespread in nature. In mammals, they are found along the gastrointestinal tract. They are considered beneficial because they protect their host against unwanted microbes and produce important compounds, e.g. vitamins and antimicrobial substances. LAB are commercially important for their use in the food and biotech industries as they are involved in processing foods like chocolate, sausages, olives, vanilla, vinegar, yoghurt and probiotics. In addition, LAB have been used by humans for thousands of years in the preservation of food. The main reason for these applications is the production of compounds that inhibit or kill other micro-organisms competing for food and space. One interesting aspect is that some of these bacterial compounds (e.g. organic acids) are already used in beekeeping today to help bees fight diseases. The beneficial honey crop bacteria constitute one of the largest bacterial groups ever found collaborating within one single organism.



The importance of bee bread

- As we know, bees do not only collect nectar from flowers; they collect pollen too. In the hive the bee fills cells with pollen and then covers the pollen-filled cells with a drop of honey. It is known that a fermentation process starts in this mixture due to the presence of microorganisms. During this fermentation process, which takes two weeks, the pollen changes into 'bee bread' which is loaded with nutrients from the pollen and serves as an essential food, for the bees and their larvae, and for the honey crop bacteria. The fermentation process makes the nutrients contained in the pollen available and preserves it from spoiling. Research has identified the bacteria involved and revealed that bees, in producing bee bread, add all the beneficial LAB to the pollen when they collect it at the site of the flower.

Bee health

- ◆ Honey crop bacteria could potentially be of crucial importance for the well-being of bees, their pollination potential, and for their production of honey and bee bread. These bacteria have been shown to inhibit American Foulbrood. With further studies, it is hoped to understand more about the importance of these bacteria and their impact on the bees' immune system and larval defences, and on bee foods. Other current investigations are also studying how some of the drugs fed to bees affect the bacteria and how this may impact both the bees' defence against diseases and their food production.



A possible solution to increasing bacterial resistance

- The over-use of antibiotics is linked to increasing bacterial resistance in humans so we are in desperate need of other treatments. The group of thirteen LAB species discovered in the honey bee have evolved together in the honey crop and each species of bacterium can produce several different anti-microbial substances, resulting in a myriad of compounds. Working with such a large arsenal of anti-microbial substances seems a good approach to prevent development of resistance by other micro-organisms, a strategy bees already use.

Fresh honey is best

- ◆ Millions of bacteria of each of the thirteen species of LAB found in the honey crop, in combination with their secondary metabolites, end up in fresh honey during its production. Unfortunately honey sold in shops does not contain any viable, beneficial honey crop bacteria. The LAB are only present and active in fresh or wild honey and only for a couple of weeks. This may be one reason why honeys differ in their anti-microbial properties.

Negative effects of Tau-fluvalinate (Apistan)

While some Varroa have developed a resistance to this chemical, it can be highly effective (99% kill) if used not more often than, say, once every 4-5 years. However a new study by Frost *et al* published in the Journal of Experimental Biology in April 2013 reports that they found that it adversely affects honey bee learning, memory, responsiveness to sucrose, and survival.

Be warned!

How to stop sugar syrup going mouldy

Dissolve 1oz thymol crystals in 5 fl.oz surgical spirit. It dissolves easily.

Use 2ml. of this solution in a gallon of sugar syrup feed. An article that appeared in The Beekeepers' Quarterly suggested 2 grams of thymol crystals dissolved (with some difficulty) in 2 litres of warm water to make a stock solution and add 46 to 66 ml of this to every litre of finished syrup – try it.

Nucleus Hives or 'nucs'

Nucleus Hives or 'nucs' are a vital piece of beekeeping equipment that no one should be without. The name comes from the fact that they contain all the components of a full colony, but obviously in smaller amounts, and with nurture, will flourish to form a fullsize honey production unit.

They have many uses which include:

1. Queen introduction
2. Queen mating
3. Proving a new queen
4. Holding spare or breeder queens
5. Re-queening
6. As part of swarm control
7. Observation hive
8. Spare boxes for holding frames and possibly the queen during Manipulation.



I would always advice a beginner to start off with a good nucleus of bees in the early summer then they can both develop together. A full colony can be a very daunting thing to control as a 'newbee' but a nuc can be managed and built up to a full-sized colony ready for winter and will provide a little honey.

What is a good nucleus?

In 1947 a British Standard (BS: 1372 (Bees: Colonies and Nuclei)) was established to set out what should be the minimum standard for a nuc being sold, but this was withdrawn in 1984. It stated that a nucleus colony could comprise of between 3 and 5 British Standard (BS) Deep frames of bees with all stages of brood. The brood having been laid by this year's laying queen—there must be sufficient food to allow them to be transported and become settled. The frames should be well covered with bees of all ages and be good tempered. Obviously, there should be no disease and a record of any treatment used, for Varroa or disease should be provided. Full details can be found at http://www.bbka.org.uk/files/library/nucleus_standard-l014_1342859848.pdf

It has been known for a nucleus to be made up with bees and brood collected from several colonies and then a new queen is added which sounds fine! The majority of the bees and brood should be from the queen in the nuc because how else can you, and the seller, be sure the queen is of a suitable quality, laying well with a good pattern and the bees have an even temper.

Later in another BeeTalk I will explain how to set-up a nucleus and how it can be used as listed above.

BEE FACTS

The bee brain is oval and about the size of a sesame seed, yet it has remarkable capacity to learn and remember things, and is able to make complex calculations on distance travelled and foraging efficiency. Research shows that bees can solve complex mathematical problems. Bees can rapidly learn to fly the shortest route between flowers discovered in random order, effectively solving the very complex 'travelling salesman problem', according to scientists at the University of London.

Ramblings of an Owd Beekeeper

Many years ago when I began my beekeeping I followed the typical path of reading and learning from books and experienced beekeepers the basic essentials of fact and action. As time progressed I naturally chose the way which satisfied me most. I began by extracting and bottling honey for sale to make my efforts financially profitable but gradually decided it was too much trouble as well as messy in the extreme.

Finally, I came to the conclusion that comb honey production was easier and almost as profitable and economical both in time and labour.

I must admit to wasting the first few years experimenting with National equipment (single brood, brood and a half and double brood) before settling upon Commercial brood boxes. No matter what the provenance of the bees, I felt that the larger capacity was always sufficient to see them through the winter. I never take off more honey than they need as I am sure they do better with honey than with syrup. This also alleviates the problem of accidental spillage resulting in a robbing frenzy. I am glad I kept the National supers, (which comfortably fit the commercial dimensions but are lighter to handle when full).

However, I decided over the years to replace wooden super frames with plastic as they are so easy to clip apart fit with unwired foundation and clip back together. For any unpackaged pieces of comb honey, especially granulated chunks, I use the stainless steel melter on a low setting and run off the honey and wax into a separator.

Having started by using Porter escapes, which are notorious for sticking and getting blocked and bent, I began using Canadian and cone type clearer boards.

Again, having started using wooden cover boards, I changed to using glass cover boards so that quick checks of the bees' progress could be seen without disturbing them and when carrying out full inspections

I use cover cloths (in pairs and rolling them). Wherever possible, I include a dummy board in the brood boxes to make manipulations easier. Naturally, I use a normal, but large, smoker most of the time but prefer to use gentle water spray where possible to calm the bees.

Do you have the odd bee that buzzes you every time you go to the clothes line or weed the garden? The ones that make mowing the lawn difficult? Well, some of this behaviour is genetic and replacing the queen may help.

If not, Ormond and Harry Aebi's book on "Mastering the Art of Beekeeping" tells you how to get over this problem.

Their solution is to make a wave cloth. In other words, have a cloth (old dirty shirt) permanently mounted on a line or stand, fairly close to the hive, which moves around in the breeze.

The bees see the movement and investigate, but can't do anything about it and soon get used to the movement around them. Very soon you can happily move around your apiary without bees investigating you.

Try it - it works!

SUMMERY HONEY RECIPIE SUGGESTIONS TO GET YOU STARTED

HONEY BARBEQUE SAUCE

2 tablespoons **Honey**
1 clove Garlic
1 teaspoon Salt
3 tablespoons Lemon Juice
3 tablespoons Water
0.5 teaspoon Chilli Powder
0.5 teaspoon Mustard Powder
Juice of an Orange

1. Crush the garlic with the salt,
2. Add the chilli and the mustard powders,
3. Add the lemon juice and water.
4. Mix together well and serve.

Delicious, especially served with barbecued chicken or pork.

BANANA, DATE & HONEY LOAF

2 oz. clear **Honey**
7 oz. S.R. Flour
1 medium ripe banana
3 oz. caster sugar
2 eggs, beaten
6 oz. margarine.
1 tsp. mixed spice
3 oz. chopped dates
1.5 oz chopped walnuts

Mash the banana and combine with the eggs. Add the honey, sugar, flour, spices and margarine. When well mixed, add the dates and walnuts. Put mixture in a lined 2lb loaf tin. Bake for 1 hour 15 minutes or until skewer comes out clean.

Oven temperature; 320F, 160C or 140C for fan oven, Gas Mk 3.

New light on middle-aged 'Undertaker Bees'

It's a dirty job and only about 1% do it at any one time. But middle-aged honeybees that serve as undertakers - removing dead bees from the hive - appear to be a distinct cadre of workers that are developmentally ahead of their peers. In this social world known for its division of labour, there also were unexpected discoveries by researchers. Undertakers don't get better with experience, and they don't do well working together. The findings are detailed in papers by Robinson, Trumbo and Zhi-Yong Huang in "Behavioural Ecology and Sociobiology".

The work - which involved identifying the undertakers, marking them with tiny, coloured and numbered plastic tags, and following them closely through middle age - provides the first close look at undertakers.

Since bees' nests are built in cavities, such a specialty is important for keeping the nests clean. "Undertakers had very similar activity levels as other bees; they just do a little bit less of the other middle-aged tasks, like building the comb and storing food brought in by older foragers. They also remove debris, which fits in nicely with undertaking. "Undertakers also develop slightly faster than other middle-aged bees, moving on to foraging before the food storers and hive builders. Middle age lasts about 10 days. Undertakers usually removed dead bees for a day or two, but "one extraordinary bee remained at the task for 13 days".

Undertakers respond to the odour of the dead, locating the bodies and carrying them out of the hive for 50-100 metres before dropping them. The researchers also monitored how swiftly undertakers worked. "We didn't find any evidence for learning for this particular task," Trumbo said. "This rules out one of the major hypotheses that has been put forward for middle-aged specialisation: that social insects will get better and better at what they do."

Previous research had shown that learning is important for the older foragers, who get more efficient as they learn what flowers are producing nectar at what time. Not only did undertakers not improve in efficiency they also got in each other's way and slowed their efficiency.

Robinson had shown previously that some bees are genetically inclined to be undertakers. He says "We're beginning to get a clearer picture of the behavioural profiles of interesting types of specialist bees, such as undertakers, Understanding the career choices of bees is a useful model for understanding behaviour in general. This new information should enable us to develop new hypotheses about how neurons and genes in the brain function to produce the marvellously complex behaviour seen in honeybee society." Honeybees acquire different job descriptions as they age. Normally, it takes about three weeks for a newly emerged bee to mature into a forager. Undertaker bees are usually around 14 days old, in the transition from nursing to foraging.

Do bees sleep?

Honeybee (*Apis mellifera*) foragers are among the first invertebrates for which sleep behaviour has been described. Foragers (typically older than 21 days) have strong circadian rhythms; they are active during the day, and sleep during the night. We explored whether young bees (3 days of age), which are typically active around-the-clock with no circadian rhythm, also exhibit sleep behaviour. We combined 24-hour video recordings, detailed behavioural observations, and analyses of response thresholds to a light pulse for individually house bees in various arousal states.

We characterized three sleep stages in foragers on the basis of differences in body posture, bout duration, antennae movements and response threshold. Young bees exhibited sleep behaviour of the same three stages. Sleep was interrupted by brief awakenings, which were as frequent in young bees as in foragers. Beyond these similarities, we found differences in the sleep architecture of young bees and foragers. Young bees passed more frequently between the three sleep stages, and stayed longer in the lightest sleep stage than foragers. These differences in sleep architecture may represent developmental and/or environmentally induced variations in the neuronal network underlying sleep in honeybees. To the best of our knowledge, this is the first evidence for plasticity in sleep behaviour in insects.

Mating biology of the honey bee -

Lecture at a Spring Convention by Dr Jochen Pflugfelder, Swiss Bee Research Centre

Dr Pflugfelder started with pictures of sealed brood laid by well-mated and in-bred queens. The research he described shows how honeybee mating has evolved to ensure that virgin queens do not mate with their brothers.

Honeybee queens mate in Drone Congregation Areas (DCAs). DCAs have been researched in the same steep-sided, flat bottomed Austrian valley for 40 years. The DCAs are mapped by students who are equally spaced across the valley floor, each having a helium balloon scented with queen substance ((E)-9-Oxodec-2enoic acid from their mandibular glands) on a long string. As they progress in a line along the valley floor, they shout out when the drones start hitting their balloon, and again when the drones stop. The drones do not follow the queens or scented balloons out of the DCAs. The DCAs have remained in exactly the same positions for 40 years, and no one knows how or why! Further research on the drones in the DCA involves using nets under the balloons so that samples can be taken. If all the drones from one hive are marked they will make up a percentage of the sample. The following day all the other hives in the area have drone 'includers', so that only the marked drones can fly. Sampling shows that the marked drones visit the DCA, find that there are not enough drones to stabilise the DCA and move away.

Through repeated sampling of captured drones, researchers found: (a) drones from within 5 km were present regularly in great numbers; (b) drones from 6 km were rare; and (c) a thousand drones are not sufficient to stabilise a DCA.

Between 1999 and 2005 the number of drones in a DCA was estimated eleven times and ranged between 8,300 and 50,000, averaging 16,000 drones waiting for the virgin queens! Drones attend the nearest DCA. Queens on the other hand, in three experiments out of four, went to a DCA further afield.

The queen's mating flight is limited to 30 minutes by the fuel in her honey stomach. She will return as soon as she has enough semen or after 30 minutes if not. Her flight, though, is dangerous. 12% do not return so the quicker the mating the better. Drones refuel at the nearest hive and then return to the local DCA. Using DNA fingerprinting, it was estimated that the drones at one DCA came from 240 colonies.

I marvel at how researchers can catch, label and release 500 drones and then take another sample 30 minutes later!

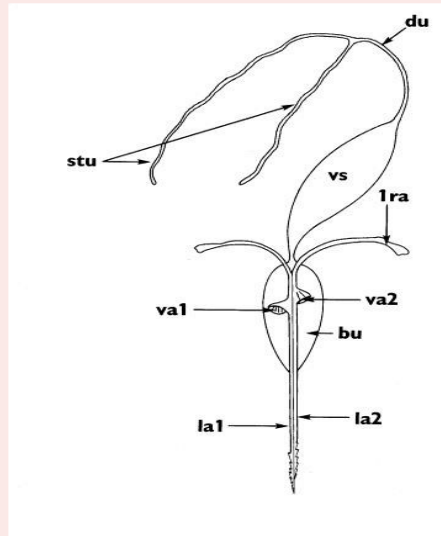
Evolution/survival of the fittest shows us how important it is for queens to have multiple unrelated mates. If you buy a mated queen, what matters is the range of sperms she is carrying and not just what she looks like and her own pedigree.

The research makes us think. How can we ensure that the virgins that emerge from our own colonies experience the best quality mating, so that they will head genetically strong colonies?

How best to deal with a bee sting

No matter what is said, some wrong ideas seem to persist in beekeeping. One is that Isle of Wight Disease was due to the acarine mite - it was coincidental that this was discovered at about the same time – Bailey & Ball looked into the matter at great length and came to the firm conclusion that IoW disease was paralysis and due to a virus (see their book *Honey Bee Pathology*).

Another canard is that one should never grip a sting and attempt to pull it out since this will have the effect of injecting more venom into the wound. Once it is known how a sting works, one will see that gripping the back of a sting can only add an insignificant amount of extra venom.



In *Form and Function in the Honey Bee* Lesley Goodman tells us: "The venom gland consists of two long secretory tubules (stu) that unite to form a common duct (du) opening into the venom sac (vs). The venom sac opens into the cavity of the bulb (bu) and acts as a reservoir for the venom which passes through the bulb and into the venom canal [the small linear space between the stylet and the two lancets] by the action of the two lancet valves (va). [In *The Honey Bee Inside out* Celia Davis tells us that these valves are cones of soft tissue.] . . . As the lancet moves posteriorly, its valve within the bulb is extended, sweeping venom ahead of it and into the venom canal. As the lancet is retracted, its valve collapses allowing fluid to move past it."

The lancets are driven by muscles working on a ramus (ra), an extension of the lancet. The two lancet umbrella valves, working alternately, each drives a dose of poison into the wound. Gripping a sting may indeed add more venom but only a tiny quantity. Time and speed are of more importance. Get the sting out of your skin as quickly as possible! Don't wait to scrape!

Red Oilseed Rape!

Although traditionally used to give soils a break between crops of wheat or barley, oilseed rape has boomed in the UK in recent years as demand has soared for the oil made from the plant, but the bright yellow petals and sweet scent of the plant have attracted growing numbers of pests, especially pollen beetles.

Chemical sprays have long been used to control the insect but resistance has been rising.

Now scientists at Rothamsted say they have a new strategy for containing the beetle. In this experiment the researchers used food colouring to change the colour of the leaves of a variety with white petals. "We grew oilseed rape in pots, washed off the soil and put the plants into buckets of water," lead author Dr Sam Cook told BBC News. "And we basically poured food colouring into the water. This was taken up by the roots of the plant and was manifested in the colour of the petals." Oilseed rape is widely grown across the UK as demand has soared for biofuels. The team coloured the petals yellow, blue and red. In the laboratory and in field trials over two years they found these made a big difference to the pollen beetles.

"Red was significantly less preferred than the blue, and then yellow and white were pretty much the same," said Dr Cook. "It's a bright red - almost a blood red really," she said.

The researchers showed that the beetles are more attracted to objects that are highly reflective of ultraviolet light. This knowledge could open up new strategies for managing the pest say the research team.

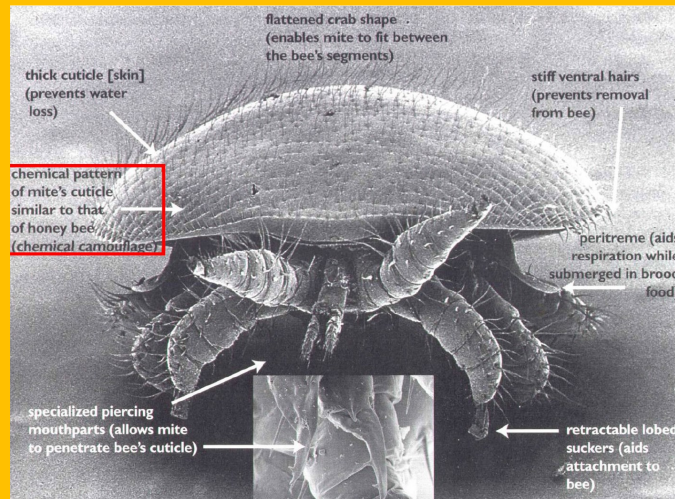
"We could breed red coloured plants. The anthocyanin gene is responsible for purple and red colouration - this gene is present in the oil seed rape family so we could breed that into oilseed rape to give a red colouration to the green parts and the petals," said Dr Cook.

One alternative being examined by several companies is to have no petals at all. Another approach could be to mix and match colours that the insects find attractive and repellent. By planting yellow varieties around the edge of a field with red cultivars in the middle you would design a trap, which would keep the pests from the oil producing crop. "It's a push pull strategy - the main crop is pushing the insect away and the trap crop is pulling it into this area where it can be controlled more easily," said Dr Cook. She says that the fields of the UK could one day become a multi-coloured mosaic.

Swarm control by taking out a 5 frame nucleus.

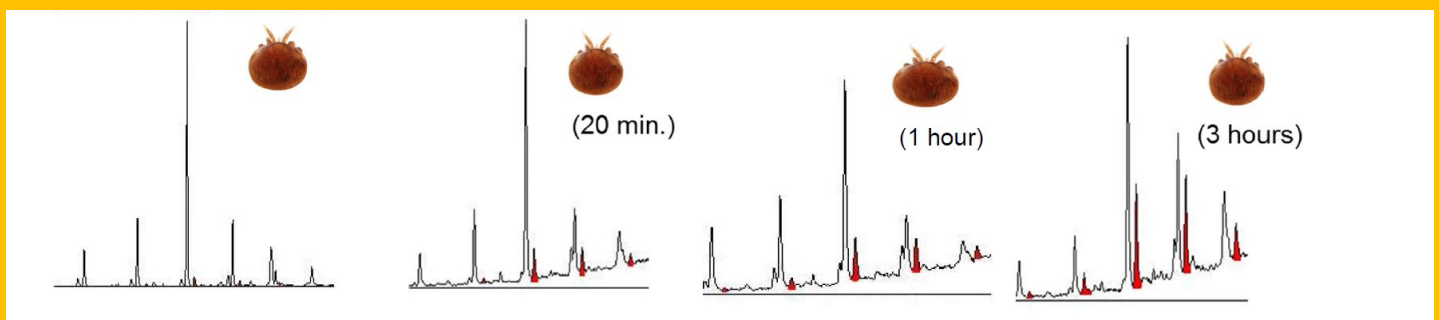
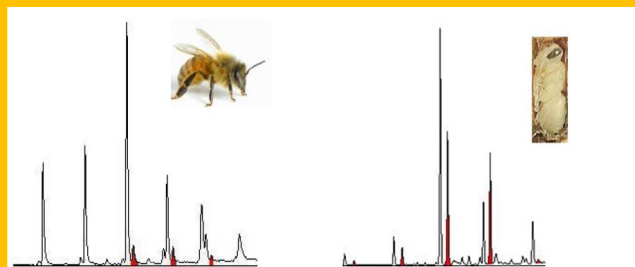
If/when queen cells are found, break them down; shake the bees off the combs to make sure you find them all! Add a super. A week later, if you find more queen cells, repeat. Breaking down queen cells should mean that the bees keep working and give you a honey surplus. But try never to force the bees to start emergency cells as these never as good. If at the third successive weekly inspection you find they have made more queen cells, transfer the queen on a frame of brood into a closed nucleus box. Add two frames of honey stores; ensure they have some pollen. If this nuc is to be left in the original apiary, shake in plenty of extra bees. In original colony reduce queen cells to one good open one and replace the 3 frames removed with foundation; return the supers. A week later, check that there is still only your chosen queen cell. The nucleus ensures you still have the original queen (in case of mishap to her daughter). Once the new queen is laying well, the old queen can be killed or used elsewhere. She often does well and will make up for any winter losses - or re-unite the nuc to the original colony.

Why is *Varroa destructor* so successful? An array of adaptations - especially chemical 'camouflage'!



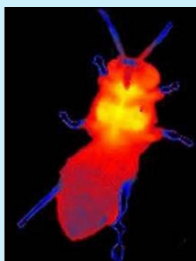
To a bee, bees from other colonies have very different 'smells'. Dr Stephen Martin remarks that 'drifting' is unknown in ants; a stray from another colony is never allowed in. While bees are much less fussy, there are marked differences in colony chemical profiles.

In the same way, both to bees, and to mites, the chemical signatures of adults and larvae are clearly and obviously different. Rickarda Kather's work explains how a *Varroa* mite, which arrives on an adult 'camouflaged' to be 'invisible' there can then alter her chemical profile so the bees in the new colony don't 'see' her. This she does by altering her chemical profile to that of the new colony. This change happens rapidly. So, comparing the profile of an adult bee to a pupa bee, the main difference is in the 'red compounds' (methylalkanes). When a mite is taken from an adult bee, the mite's red compounds are low (as in the adult bee) but when transferred to pupa, the first change in compounds can already be recorded after 20 minutes and will be almost complete after 3 hours of sitting on the bee. The mite just absorbs them and becomes essentially invisible. Dr Martin's parallel is that appearing at Old Trafford in any shirt but red is unwise!



Secrets of the Hive - Another Hot Topic!

We were always taught that workers went through a number of roles between emerging and death, nurse, cleaner, guard, forager. We do know that if the nurse bees are lost then foragers can change their behaviour and feed the brood, but another factor has been revealed in the assignment of roles within the hive. A short piece from Richard Hammond's Invisible Worlds (BBC, March 2010 <http://www.bbc.co.uk/programmes/p007vr7>) shows that different temperatures within the hive affect what roles the workers assume. It is a shame that such excellent scientific reporting using state-of-the-art technology normally out of the reach of research academics is ruined by sloppy reporting. The following is the script of the programme but I confess to removing some cringe-worthy adjectives that I think degrade what is otherwise an excellent report. (Am I being fair? Can you spot more irritations? To what extent does populist reporting degrade the science?).



“... inside a bee hive is one of the most sophisticated living things in the history of evolution. One bee on its own doesn't amount to much, but taken together a very different picture emerges. Seen normally, all these bees may look the same, but go beyond the ordinarily visible into the infra-red and some bees are warmer than others. Some glow bright orange like hot coals, radiating heat to their surroundings. Others are dark and cool. It's the precise control of heat that allows a bee colony to be such a unique and successful form of organisation.

But what is all this heat for? Heat is concentrated in one central area of the hive, the brood nest, where young bee pupae are growing. A bee that may appear relatively still, when looked at in infra-red is glowing bright orange, revealing its role as a specialist heater bee. The bee warms itself up by vibrating its flight muscles—vibrations that allow it to warm up to 44° Celsius, previously thought to be high enough to kill it. Others that seem to be grabbing a quiet snooze are actually tight little balls of fire that are acting in a motherly role to keep the brood warm. Without warmth the babies will not grow and develop. It is also now clear why bees spend so long foraging for nectar that will be turned into honey, as over two thirds of the hive's honey goes on the central heating of the colony. A rarely seen moment is caught on camera when an exhausted heater bee is topped up by a refuelling bee just returned from foraging. These images have revealed something extraordinary. By precisely controlling the temperature, these heater bees control the destiny of the young. Incubated at 34°, the newly born bees are likely to become humble housekeepers, but kept just one and a half degrees warmer, they may instead turn into intelligent and high-ranking foragers, living up to ten times longer. None of these new discoveries would have been possible without our ability to see into the infra-red spectrum.”

Show a leg!



We've all seen the classic photos of bees approaching the hive with their legs dangling and wondered why they adopt such an uncomfortable looking posture. Well there may be an answer! Unlike aircraft, having their landing gear down allows bees to fly faster.

When orchid bees extend their hind-legs they pitch forward to achieve maximal speed and the legs produce lift forces to either side that help prevent the bee from rolling. "The hind-legs resemble airplane wings, which probably explains why they also generate lift", says Dr Stacey Combes from the University of California, Berkeley, who presented her research April 4 at the Society for Experimental Biology's annual main meeting in Canterbury, Kent. This research is interesting as it could be applied to design miniature flying machines to be used for search and rescue missions. "It may be helpful to be able to reduce the number of control components needed by using one structure (like the orchid bee legs) to control both pitch and roll". The researchers perform their experiments by encouraging the bees to fly in an outdoor wind tunnel using aromatic oils as an incentive. The bees can reach a maximum speed of 7.25 m/s but at these

these

speeds they lose rotational stability: "They roll all the way to the side or often upside down, and crash to the ground", she observes. This means that what limits the bee's speed is not muscle power or wing beat, but the pitch of the body balanced with the resulting rotational instability. "Having the legs extended generates stabilizing lift forces and helps reduce the moment of inertia and the low rolling, similar to when a spinning figure-skater extends their arms". .

Does Wide Spacing Control Varroa?

Over the last few years there have been several articles in Italian beekeeping magazines about the use of wide frame spacing to control varroa. A presentation was made on the subject by Dr Tiziano Gardi at the Dublin Apimondia.

His presentation reported on a 3-year project, financed through an EU grant, completed in August 2006 and submitted to the Italian Ministry of Agriculture, Food and Forestry. The objective was to evaluate the effects of the "*Spaziomussi Bio-Technique*" in colonies of *Apis mellifera ligustica* and its ability to reduce varroa destructor numbers, (Spaziomussi is a method of spacing frames devised by a Mr Mussi). 855 hives with wide frame spacing were set up in 15 apiaries in 6 provinces in Italy; the resulting observations in colonies were significant and were:

- a. An immediate increase in the drop of both mature and immature mites.
- b. A lower tendency to swarm and in the 3rd year practically no swarming was experienced.
- c. No deformed bees were found.
- d. A more compact brood pattern was observed.
- e. Healthier bees, a result of the reduction in virus infection and chalk brood.
- f. Honey yields increased on average by 22%.

The report concluded that Mr Mussi's spacing method is effective. In the UK 35mm spacing is the norm and the nearest we have to the wider spacing used in the Italian trial would be by using Manley frames or 10 space castellated runners - both give a 41mm spacing.

To give a similar arrangement with National brood boxes, remove one frame. Put a wide plastic spacer on the first frame followed by a narrow plastic spacer on the second, etc., so the ten frames now have alternating wide and narrow spacers. If it is the success it claims to be, why have we not heard about it before? The Taunton newsletter *Beelines* reports someone in their Avon Division using it for several years and who says it is effective. It could be worth a try in 2024.

Is Garlic the Answer?

A Bee-keeper carried out a trial over 2009/10 and his hives not only survived one of the worst winters that we have ever had, but the brood increased by 30%. HOW?

There were very varroa few mites at the time of the brood. WHY?
These results have continued.

1. All hives were kept clean and free from chemical insecticides. It is thought that over time, the insecticides impregnate the fabric of the hive and are the serious cause of colony collapse (Ohio, USA Bee-keepers). So new frames, or frames free from contamination are needed.
2. A winter feed of 5grams of garlic to 1 kilo of sugar in solution was given until the new brood started. Garlic was then discontinued during honey production. However replacing garlic with an infusion of nettles to the last feed increased the brood by 40%. As many humans use garlic to boost their immunity to disease. Does it also do this in bees? Nettles contain trace elements, maybe these increase fertility? Garlic is also known to kill and/or cause the varroa mite to leave the bees.
3. The colonies were large, at least 1 1/2 times the brood. This ensured enough warmth & ample workers in winter for food gathering.
4. The garlic controlled the varroa mite in the winter and icing sugar dusting controlled the mite in spring and summer.
5. You will also need nectar and pollen rich flowers. Please plant them.



This system is cheap, organic and it works! So could garlic, or any alium spp, alter the odour balance inside the hive to the detriment of the varroa mite? If so, would it not upset the bees' pheromone communication?

At worst it seems harmless, and proprietary feeds contain supplements, possibly even nettle extraction. Only proper trials would give a clear result, but it is an interesting thought

Gardeners urged to save ivy for bees

Professor Francis Ratnieks

and Mihail Garbuzov.

It damages building, overwhelms flower beds and strangles trees, but there may now be a reason for gardeners to value ivy. It is one of the most important sources of food for honeybees, scientist have discovered. Ivy provides most of the pollen and nectar they collect during the autumn months, when the insects are trying to build up stores of honey for the winter and feed their young.

Honey bee numbers have halved over the past 25 years in Britain. Bumblebees are also suffering. It is thought that growing disease, poor summers and the loss of wild flowers may have all contributed to the collapse of bee colonies.

Beekeepers expect a poor crop during this year following last year's wet summer and the cold winter.

Prof Francis Ratnieks and Mihail Garbuzov, from the laboratory of apiculture based in the University of Sussex, studied the waggle dance by which bees direct other members of the hive to food sources, and the pollen being brought back.

They found that bees in Brighton and rural Sussex travelled less distance to collect food in the autumn than during the summer when they forage in fields and on wild flowers.

They also discovered that 89 % of pollen on the bees was from ivy and that 80% of the bees collected nectar from the creeper.

Prof Ratnieks said "Bees, butterflies and other flying insects visit the flowers for food in huge numbers. It is unusual to see a single plant that plays such an important role over the two months that it flowers for."

He also urged gardeners not to rip ivy out when tidying.

The study is published in the journal "Insect Conservation and Diversity"

Scientists probe link between diesel and bee decline

Possible links between diesel fumes and collapsing honey bee colonies are being investigated by scientists. A University of Southampton study will investigate whether tiny particles from diesel engines could be effecting bees' brains and their navigation. The three-year study will look into whether it is one of the factors affecting bee numbers. The collapse of bee populations has been recorded around the world although extensive Possible links between diesel fumes and collapsing honey bee colonies are being investigated by scientists. A University of Southampton study will investigate whether tiny particles from diesel engines could be effecting bees' brains and their navigation. The three-year study will look into whether it is one of the factors affecting bee numbers. Researchers at the university will test the behaviour and neurological changes in honey bees when they are exposed to diesel nanoparticles. Professor Guy Poppy said "Diesel road-traffic is increasing in the UK and research from the US has shown that nanoparticles found in its fumes can be detrimental to the brains of animals when they are exposed to large doses. "We want to find out if bees are affected in the same way - and answer the question of why bees aren't finding their way back to the hive when they leave to find food". Dr Robbie Girling, said: "The diesel fumes may have a dual affect in that they may be mopping up flower smells in the air, making it harder for the bees to find their food sources." The collapse of bee populations has been recorded around the world although extensive research has yet to identify the cause of the decline and offer a solution to the problem.

Approved Bee Medicines

Although varroa levels may have been lower in some colonies during last year, possibly due to good winter controls with organic acids and thymol treatments, they remain a major problem for beekeepers and bees alike.

Remember that Fumidil B's licence has not been renewed by the Veterinary Medicines Directorate (VMD) and therefore it is NOT registered for use in the UK. So it is important to be aware of the approved medicines that are available to treat our bees.

The following is a list of currently approved medicines.

Product	Active Ingredient(s)
Apiguard Gel (25% Thymol) for Beehive Use	Thymol
Apilife Var Bee-Hive Strip for Honey Bees	Camphor Racemic, Eucalyptus Oil, Menthol
Apistan 10.3% w/w Bee Hive Strip	Tau Fluvalinate
Bayvarol Strips 3.6 mg	Flumethrin
Thymovar 15 g Bee-hive Strips for Honey Bees	Thymol
Mite-away Quick Strip Beehive Strip (Formic Acid 68.2g)	Formic Acid

Note - Treatments are approved for use in honey bee colonies in this country by the VMD and not by the NBU. Other treatments from Europe are available for use under the 'Cascade' system. Please visit the VMD website for information and import regulations, at www.vmd.defra.gov.uk

Question - What is the size of the slots in a queen excluder ?

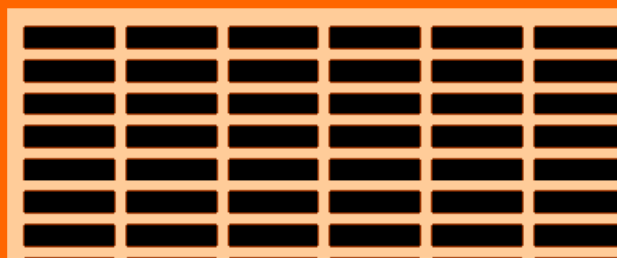
As with many things in beekeeping there is not one answer to this question, because it depends upon the type of queen excluder you are considering.

However, the importance of the size of this gap was recognised by Abbe Collin in France in 1865 when he first invented the queen excluder. The correct slot size according to some authorities, such as Morse and Cooper's 'Encyclopaedia of Beekeeping' is 0.163 inches (4.1042 mm).

The following are some typical slot sizes.



Slotted Zinc QX - 4.38 mm slots



Plastic QX - 4.35 mm slots



Herzog QX (also known as Waldron QX)
4.1 to 4.22 mm slots

No matter what the size of the slots the uses of the queen excluder include:-

- Restricting the queen to the brood next
- restricting the queen from swarming
 - delaying the mating flight
- restricting drones from passing through

Mind the Gap !!

Gap sizes are an important feature of beekeeping. The following is an explanation of some gaps of which to be aware.

A gap of less than 4 mm... is too small for any but deformed worker bees to pass through. Any spaces, cracks or crevices of this or smaller dimension will be filled with propolis or sometimes a mixture of wax and propolis and on yet other occasions pollen may be mixed in with the filling.

A gap of 4.3 mm... is a standard European spacing for wires in a Queen Excluder.

A gap of 5 mm... if used between the wires of a square mesh will make an excellent pollen stripper as the workers can get through, but a significant portion of the pollen will be stripped from their legs.

A gap of 5.2 - 5.4 mm... is a spacing that can be used to exclude or differentiate Drones as Workers and Queens will pass but Drones cannot.

A gap of 6 mm... is the smallest gap that bees will leave between adjacent comb surfaces, (outside of the usual clustering area). The bees can defend this more easily and they can work individually within this dimension. The smaller gap around the periphery of the nest, also renders the nest less susceptible to draughts, and may help in maintaining humidity.

A gap of 7 mm... is not used by the bees themselves, but some people regard it as a valid bee space to use in some parts of beekeeping equipment. If this spacing occurs between the side faces of frame top bars they are the least likely to suffer from accretions of wax. Frames spaced at 35 mm pitch (normal Hoffmann spacing) that have top bars 28 mm in width give rise to this 7 mm gap.

A gap of 8 mm... is a popular bee space among those that design their own equipment as it falls midway between the 1/4" and 3/8" figures so often quoted in old books.

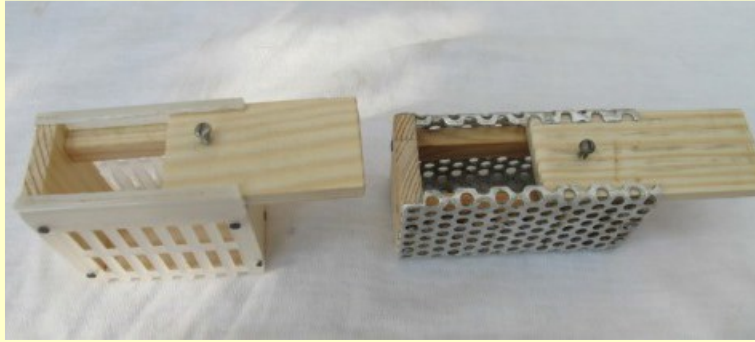
A gap of 9 mm... is the usual space the bees will leave between adjacent areas of capped brood this allows two layers of bees to work back to back, usually in an oval pattern in the centre of a frame.

A gap of more than 9 mm... and we are into brace comb territory !

A gap of 10 mm... is practical from a design point of view. With the B.S. Brood frame at 215 mm (some are 216 mm) and the Shallow Frame at 140 mm The boxes are then 225 mm and 150 mm respectively. This gives 1 mm above the frames and 9 mm below (or the reverse if you are top bee space oriented). In all things there are exceptions, when it comes to the gap between the frame bottom bars in the bottom box and the floor surface underneath it, this is usually 28 mm or 31 mm in UK hives, but it does not suffer brace or burr comb unduly, as the bees consider it a similar situation to a wild nest in a cave .

Queen Cage

This issue we feature a queen cage made with recycled materials. Wood (4 mm x 24 mm) is required for the frame work, and this can be off-cuts from other woodwork projects. For the plastic sided version just cut off the top portion of a suitable container to form a small lip to hold the sliding cover. Note the wooden runners inside the cage, on which the wooden lid slides. Cut the wood to the size that suits your recycled material, but do not make it too big, a size to fit conveniently into your pocket is best.



The metal version also has a perforated metal base. Use two Mole-grips to hold two pieces of wood (on both side of the material) and form the lip to hold the sliding cover with a hammer. Bend the metal into a U-shape to create the sides, base, and lip of the cage. Nail together carefully with the small pins.



Normal plastic queen cages that you buy are so small and difficult to open with thick gloves, also they are difficult for the beginner to catch the queen and place her inside during such things as comb changing, shook-swarm etc. This DIY version has a big opening to guide the queen into with your hive tool, and even wearing gloves you can easily shut the cage cover and put the cage into your pocket; and then release the queen back into the hive when you are finished. The cage can also be used for introducing a new queen by opening the lid to a bee space, say over 6 mm, and blocking the opening with fondant which as the bees remove, they should become accustomed to this new queen. Because the DIY queen cage requires more room than the usual purchased plastic cage you may need to remove a frame from the hive. Please see the pictures to see how simple it is to make, and being made from recycled materials it costs almost nothing. And it is fun to make your own items useful for beekeeping.

Something to do over the cold winter months.

Recipe (25) Date Shorties



1 tablespoons **Honey**
6 ounces Margarine or Butter
3 ounces Sugar
6 ounces Self-Raising Flour
6 ounces Semolina
6 ounces Dates
2 teaspoons Lemon Juice
¼ pint Water

Melt margarine and sugar. Stir in flour and semolina.
Spread ½" deep in tin.
Chop dates, heat in pan with water, honey and lemon juice. Cover previous mix, spreading evenly.
Bake at 350°F for 30 minutes.

Recipe (26) Flap Jacks



2 ounces **Honey**
4 ounces Brown Sugar
4 ounces Golden Syrup
6 ounces Butter
6 ounces Rolled Oats

Preheat oven to 180°C.
Line the base of a shallow 9" square cake tin with baking parchment and grease well. Put the butter, syrup, honey and sugar in a medium pan.
Stir over a low heat until the butter has melted and the sugar has dissolved.
Remove from heat and stir in the oats.
Press into the tin.
Bake for 20-25 minutes until golden on top.
Allow to cool in the tin for 5 minutes then mark into bars. Cool completely before cutting and removing.

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UK Honey Labelling Regulations

*Below is our simple advice on honey labelling.
For more detailed information - go to the website
of the Food Standards Agency. www.food.gov.uk*

- 1. The Word "HONEY" is required.*
- 2. The weight must be on the label - we will ensure it is the legal size and format.*
- 3. You can specify the area where the honey is produced. For example, Lincolnshire, Forest of Dean, Scottish Borders.*
- 4. You can specify the type of honey. For example, Heather, Borage. The honey must be at least 75% of that particular type.*
- 5. If you are selling the honey, you must have your name and address on the label. It does not need to be complete but you should be able to be found from the information.*
- 6. If you are selling the honey through a third party, you must have a lot number.*
- 7. New for 2003 You must have a best before date on the jar. We suggest 2-5 years from now.*
- 8. New for 2003 You must have a country of origin on the jar. For example - Produce of England, Product of Scotland, Harvested in Wales. Adding the country to the end of your address is not acceptable.*

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