Beetalk September 2021

General info and news about bees

Hello and welcome.

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

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 this wonderful 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. And to everyone of our readers. Have a great Christmas and all the best wishes for the coming year, both in health, wealth and happiness, and may your beekeeping year be a great one.

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

at

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The queen is dead ..... Long live the queen!

In June of last year I became a beekeeper and the proud owner of two hives of bees. Then the learning curve began! By mid August the larger of the two colonies appeared to have become queenless and, as I saw it, I had two options - I could either take a frame of eggs and brood from the hive that had a queen and put it in the queenless hive or I could introduce a new queen. In view of the time of year I decided to introduce a new queen and on Monday 22 August I placed an order for a mated queen. Twenty four hours later the postman arrived with an A5 envelope. Inside was a small wooden box - the top of which was covered with a wire mesh and inside the box were six attendant bees and a queen. The instructions said: "Go in to a room, ensure that all doors and windows are closed, take off the wire mesh, remove all the bees and then put the queen back in the box and replace the wire mesh." I guess for an experienced beekeeper this is probably quite straight forward but for a novice it was all pretty daunting. Removing the bees proved more difficult than it first appeared and in the end I resorted to shaking the bees out on to a cork mat and catching as many as I could with a press-in-cage making sure that one of those that I caught was the queen. Then, by tilting the cage and flicking out the remaining attendants I was left with just the queen. An experienced beekeeper recently told me that queens only fly twice in their lives - once when they mate, and once when they swarm. Well, in my experience, they also fly when you try and pick them off a cork mat! In fairness she didn't fly far preferring to hide under the desk, then under the filing cabinet and finally taking refuge behind the radiator. At this stage I had two concerns – firstly, do queens sting? And, secondly, how easy are they to damage when you pick them up? In the end, when I eventually had her cornered, I picked her up carefully but firmly, put her back in to her wooden box and replaced the wire mesh ..... all completed without being stung! Referring back to the instructions: "Remove the cork stopper from the end of the box containing the fondant and place the box between 2 frames containing larvae ensuring that the wire mesh is facing downwards. After introducing the queen do not disturb the hive for at least seven days." My hive in fact didn't have any frames containing larvae so I chose two suitable frames approximately in the centre of the brood box. To ensure that the box stayed where it was supposed to 1 hammered in two small pins on each side of the box so that when the frames were pushed together the pins pierced the foundation and prevented the box from slipping down. When I inspected the hive on Sunday 4h September the little wooden box was empty and there were two frames containing eggs, larvae and sealed brood. This gave me a serious confidence boost and I'm now looking forward to next year when I might even be able to extract some honey!

Sticky Stuff Remover

An absolute must for the household – and honey bottlers in particular! Tackles: Adhesive Labels, Candle Wax, Chewing Gum, Tar and much more! Excellent for removing the remains of tamper-proof labels from lacquered lids and your old honey labels from glass jars being recycled. Pleasant smell in use but this cannot be detected once the cleaned substrate has been washed with ordinary soap and water. Safe, too, to use on clothing, skin & hair – but obviously read the instructions first. Available as a liquid (Aldi) or as a gel (Lakeland Plastics) – I find the latter easier to apply to the area to be treated.
Sticky Stuff Remover ® www.desolvit.co.uk

Gardens Offer Bees An Oasis In The Middle Of An Agricultural Desert

By Caitlin Kight University of Exeter

Researchers have known for some time that gardens provide a useful source of habitat in the midst of urban areas. The cultivated plants they contain encourage the growth of communities that can have a positive impact not only on the gardens themselves, but also on nearby habitats. Bees, for instance, may forage hundreds of meters away from the gardens in which they live; during forays outside of garden walls, they often pollinate native flowering plants, thus perpetuating populations of endemic species.

Few scientists have investigated whether gardens might also be beneficial in agricultural areas. Because farms contain plants, they may seem more "natural" than urban areas. However, like impervious surface cover and anthropogenic structures, agricultural fields can reduce habitat and decrease biodiversity. Agricultural intensification has been linked with declines in pollinator populations; this may be driving the simultaneous reductions observed in native out-crossing plant species. Thus, it would appear that flowering plants in and near farm areas are poised to benefit from bee-friendly gardens.

A group of researchers from Lund University recently investigated this possibility in an agriculture-dominated area in the south of Sweden. Using pan-traps (to capture bees) and phytometers (peach-leaved bellflower plants, Campanula persicifolia, deliberately set out to measure pollination), the researchers measured whether bee richness and abundance were higher close to gardens (at a distance of 15 m) than farther away (at a distance of 140 m). Because different types of bees have different pollination habits (for instance, because of variations in sociality and body size), the researchers also examined whether abundances of different groups of bees varied according to distance from gardens. Finally, the scientists harvested the seeds that developed from the phytometer bellflowers. By measuring seed weight, the researchers could evaluate pollination quality--since heavier seeds would indicate a higher number of successfully pollinated ovules.

Across all pan-traps, the researchers sampled 244 bees of 28 species and 8 genera. The most abundant social bee was the buff-tailed bumblebee (Bombus terrestris), one of the commonest bumblebees in Europe, while the most abundant solitary species was a mining bee (Andrena nigroaenea). Bees were present in much higher numbers nearer gardens: On average, 24 bees were sampled per 14-m trap, while only 7 were sampled per 140-m trap. These patterns were true for both social and solitary bees; however, the effect was stronger for the latter than for the former--likely related to the fact that larger social bees are stronger fliers and can more easily reach distant pollination sites. Capsules near gardens contained heavier seeds, indicating that more of the plant's ovules had been fertilized--a result of increased pollination.

GLIMPSES FROM THE PAST

"It is a creature gentle and loving and familiar about the man which been ordering of them, so he come neate, sweet and cleanely among them; otherwise if bee have strong and ill smelling savours about him, they are curst and malicious, and will sting pitefully." William Lawson, A New Orchard and Garden , 1618 "…..store of bees, in a dry and warm bee-house, comely made of fir boards, to sing, and sit, and feede upon your flowers and sprouts, make a pleasant noyse and sight. For cleanly and innocent bees, of all other things, love and become, and thrive in our orchard. If they thrive (as they must needs if your gardener be skillful, and love them: for they love their friends and hate none but their enemies) they will besides the pleasure, yeeld great profit, to pay him his wages; yea the increase of twenty stock of stools with other bees, will keep your orchard."

MILKWEED AS AN INSECT INTOXICANT Scientific American, October 29,1881 A writer in the Pharmaceutical Journal, speaking of a visit to Kew Gardens, says: It is amusing to see the numbers of bees hanging off the sweet-scented flowers of Asclepias cornuti (milkweed) perfectly intoxicated, so that they will not move even when roughly touched, one being noticed by the writer to be apparently "dead drunk" on the ground. The numerous bees which visited the flowers of the teasel seemed to be similarity affected. It would be interesting to learn whether the I SOMETHING TO THINK ABOUT Every beekeeper you meet knows something you don't; learn from them GLIMPSES FROM THE PAST 684 flowers of the 'Asclepias' which are known to contain a sort of sugar, really do possess an intoxicating principle, since the soma plant of India, alluded to in the Sanskrit Vedas (which some place as far back as 20 centuries B. C). and the juice of which yielded, by fermentation, an intoxicating liquor, is supposed to be a species of 'Asclepias' The milkweed must have acquired these intoxicating properties through change of soil and climate, since we are positive that they do not exist in the plant in this, its native country (N. America. Ed.). We have watched bees gathering nectar from the flowers many a time, but we never observed that it had any intoxicating effect upon them, and we do not believe that any one has observed such a fact here.

HONEY IS USED IN MAKING GOLD INK Toledo Blade, 23rd Sept 1885 Genuine gold leaf is rubbed with honey on a plate of agate or ground glass by means of a flat pestle, until the whole presents a uniform mass, in which no distinct particles of gold can be recognized. This mass is carefully removed into a vessel with water, which will dissolve the honey and leave the gold in an extremely disintegrated state behind. The water has, according to the size of the vessel, to be removed twice or three times, when all the saccharine matter will have been washed away. The remaining gold is then mixed with a sufficient quantity of a solution of gum Arabic, shaken well, and is ready for use. The writing is to be rubbed, after drying, with a flat piece of ivory, when it will present the lustre of pure gold. Silver ink is prepared in the same way, from silver leaf.

SUMMER WORK OF BEES The nectar so sweet the bee-keeper sees, His hives filling up by the work of the bees. Each coming laden with sweets from the trees. A merry young bee goes forth from the home, Mingling with the others thus ready to roam Every one off for the flower-decked fields, Right where the basswood so gratefully yields Its bountiful treasure of bright, golden sweet, Cheering each bee that so gladly they meet; A busy and buzzing crowd are they Not stopping to idle, but working all day. But to aid their keeper, we must allow, Every bee makes it a solemn vow, Ever to labor as hard as now. Just over the hillside decked with flowers, On field and meadow. 'neath blooming bowers, Unseen and unheard does the "busy bee" work, Rushing hither and thither, but never to shirk, Now dandelions, butter-cups, lady-slips too, Are yielding their sweetness for me and for you Loving the bees for all that they do. George W York, 1888

Women and Bees. 'Tis a fact that can never be questioned, However absurd it may sound,
That twixt women and bees a resemblance Most wonderful is to be found.
They have both of them "combs," that is certain, And in energy neither are lax And though honey to both is delicious,
They are both now and then in a "wax." A wife full of cares economic Is most like an industrious bee
And the waist of a bee on a lady Is something delightful to see.

Fumidil B substitute ?

I see in the January - April Newsletter that many have a problem with *Nosema apis.* Englishmen have a general problem with everything that isn't confirmed scientifically or in the media. Now, some advice from a professional of 27 years, personally

I never had and I don't have Nosema apis in the apiary but why are Varroa floors recommended for use in England? Such a humid climate is a basic factor for triggering a Nosema apis epidemic. To treat Nosema, I make a tincture from the herb Rumex obtusifolius, commonly known as Broad-leaved Dock.
I infuse 200g of the herb with 250 ml of 95% ethanol and after 2 weeks add 4 ml of this to 1 litre sugar syrup. I apply this once a year prophylactically in the process of autumn feeding. For varroa,
I also have my own medicine with an effectiveness of 95% - but I would like to patent it.

When they are broodless, spray the bees with it over sticky floors.

I will only say it is made from three plants: Tansy (Tanacetum vulgare), Chelidonium majus (greater celandine) and larkspur (Delphinium consolida) - it is an old Siberian way of dealing with varroa!

Piotr Juszczak

(A Polish beekeeper, now living in Ipswich) I wonder whether this herbal treatment is effective - or even legal - in England? I suspect not, but can anyone advise? - Ed.

Principles of Disease Control.

Last year, we saw a 10% increase in the number of apiaries in the UK and 406 new beekeepers registering on Beebase. We also (in Wales) saw a threefold rise in the number of apiaries infected with foulbrood compared with the previous year. This growing enthusiasm for beekeeping is welcome indeed. The increased trade in bees and equipment, however, carries with it the heightened potential for disease transmission. Sound biosecurity practices and effective barrier management controls have never been more important. It is well worth reminding ourselves of the basic principles in order to minimise our bees' vulnerability to disease and our contribution to its control - or its spread. There are 10 Golden Rules to disease control: Know your enemy: You should be familiar with the signs and causes of the diseases that may affect your bees and with the measures required to help keep your colonies healthy and productive – and any action you might need to take. Foulbrood is a notifiable disease - you need to call your Seasonal Bee Inspector if you suspect you have it. Brood health: Inspect your colonies at the very least every spring and autumn, specifically to check for brood disease. Create enough working space in the brood box by removing one or two outside frames and shake the bees off each comb to ensure you see all the brood. Be confident that you know the appearance of healthy brood. If you are unsure of what you find, seek expert advice – and don't forget the resources on Beebase. Colony management: Always check for signs of brood disease before you transfer comb between colonies, divide colonies or move colonies to out apiaries. Have a policy of returning supers to the same apiaries - or even hives Weak hives: If any colony appears not to be thriving and the reason is not already known, examine the brood for signs of disease. If you're unsure, seek further help. Use washable or disposable gloves and regularly wash your bee suit. Dead outs: If a colony of bees dies out at any time, examine the brood combs for signs of disease – and seal the hive to prevent the remaining stores from being robbed out before you have a chance to inspect. If you're sure there is no disease, melt down all the old brood combs and be prepared to fumigate super combs. Comb management: Regularly and systematically replace old brood combs in the apiary by melting them down and replacing them with frames fitted with foundation. Never buy old combs. Swarms: Be suspicious of stray swarms. If you hive them, do so on foundation rather than drawn comb and keep them isolated from the rest of the apiary. Inspect them for disease once they have brood in all stages. Robbing: Minimise the potential for robbing in the apiary. Never leave combs or honey exposed to robbing bees. Never feed honey from another source to your bees. Carry a bucket for removing wax scrapings from the apiary and regularly melt them down. Biosecurity: Always ensure that any colonies, combs or beekeeping equipment you bring into your apiary has come from a disease free source. 'Isolate' incoming colonies or nucs, including those from reputable suppliers, until you are sure that they are disease free. Disinfection: Sterilise second-hand hives by thoroughly scorching them with a gas torch before installing in your apiary. Keep a strong solution of washing soda/water (1kg/5l) for disinfecting other items. Further information on all of these points is available on Beebase where there is a wide range of advisory leaflets, factsheets and FAQ's. Go to www.nationalbeeunit.com Frank Gellatly RBI Wales This has been reproduced thanks to eBEES, from the Welsh BKA magazine for Spring 2012 LDBKA bees go on holiday At the BBKA Spring Convention last month some LDBKA bees went on a mini break to take part in the two-day Terry Clare queen-rearing course. On the Wednesday before the Convention weekend eight colonies, belonging to Peter Blake, Andy Vanderhook, Charles Miller and Mike Saunders, made the trip North to Harper Adams University College courtesy of Hamish Barber. As everyone will recall that week was very, very wet! The consequences of all that rain became clear when Peter Blake and Tiny Beavan, who were assisting Terry in the course, came to open up the hives on Day 2 of the course to look for first day larvae for the students to use to learn their grafting techniques. As Peter explained, "the weather was so bad that by the time the bees had been on site for three days they were still only making orientation flights. (Just as a matter of interest, two of the hives which are *Apis mellifera mellifera* were flying half an hour before the other Out of eight hives we only managed to take a total of seven frames as the queens had all but shut down laying. We would normally have expected to be able to take [two or three?] frames from each hive." Nevertheless the course was deemed a great success. It attracted a very large group with 32 participants travelling from all round the UK from as far afield as Scotland, Norfolk, Wales and the South Coast. The feedback from delegates was very positive.

June – Swarms care? A swarm of bees in May Is worth a load of hay;
A swarm of bees in June Is worth a silver spoon;
A swarm of bees in July Is not worth a fly.

What does this poem mean?

Well swarms need aftercare if they are to build-up and are big enough to survive the winter. If it was an early swarm then could have built up to be sufficiently strong to gather a crop during the late summer and so is worth something. In the days gone by barter meant it equated to a bale of hay!

A swarm can be one that you collected or one that was attracted to your bait hive but it also includes those artificial swarms you made. The box left after the 'AS' which contained the brood and queen cells will be depleted of foragers, and will have a brood gap as it will take at least two weeks before the new queen starts to lay. This will need some TLC. So how do we care for a swarm? Firstly wait 24 to 48 hours before feeding unless they are at the point of starving. This has two benefits: firstly, the bees will use up the honey they brought with them in their honey stomachs rather than storing it and contaminating the new drawn comb. Secondly, it reduces the risk of robbing as all the bees will have orientated to their new home and will defend it.

Once this time has passed then feed weak syrup (1:1) but don't put a 'load on' in one go! What you want to do is provide a steady supply of food which will be like a natural flow. Add a pint or two at a time and keep feeding until they have drawn out about 75% of the comb in their box; by then (hopefully) they will be able to collect their own food.

Once you have stopped feeding it is time to add the first super should it be an early swarm. After 'hiving' is the perfect time to treat for Varroa because there will be a 'brood break' or at least a period of little open brood.

All this means there will be lots of desperate female mites looking for somewhere to lay so this can be used to trap and remove them. A simple icing sugar treatment will work well because as a lot of mites are phoretic (the phase when the mites are piggyback on the bees) with few inside the cells so they can be knocked off.

Another trick is to put a frame of open brood from a disease free colony into the centre of the swarm's box; this will attract all the free mites and can be removed once sealed. Once the swarm has new brood, if it is a foreign one you caught you must check for brood diseases.

Finally, although less likely, swarms can build up and swarm so do not neglect your checks.

BODY ODOUR

Larvae are seemingly pretty inert individuals, sitting curled up in their cells doing very little except eat, but brood has a huge influence on the workings of the colony: the amount of sealed brood present is very influential in determining whether a colony sends out casts after the primary swarm has left, the presence of brood suppresses laying workers much more effectively than a queen, brood has an influence on foraging, the type of brood influences feeding regimes and there are many more ways in which brood is important. So how does the brood communicate with the colony so that the nurse bees 'know' what brood is present and understand how to feed it, when to cap it over and so on? Other questions that arise as far as adults are concerned is recognition of nestmates at the various stages of their lives and identification of the different types of bee in the hive. We have already seen how the queen produces pheromones, which influence behaviour in the colony, and briefly considered the effects of Nasonov pheromone produced by the workers, and this month we are going to look at a group of chemicals which have a profound effect on colony organisation and are produced by all the individuals which are part of that colony. The outer covering of the honey bee, whether larva or adult, is a complicated structure containing many different chemical compounds and including ten fatty acid esters which seem to be particularly important as pheromones. (For those of you with chemical backgrounds these substances are the methyl and ethyl esters of palmitic, linoleic, linolenic, stearic and oleic acids.) In the larva they appear to be produced and stored in the salivary glands. The same esters are produced by all stages, but in differing amounts, and different mixes, according to the age of the larva/pupa/adult and the gender and caste of the adult. This enables worker bees to distinguish between worker, drone and queen larvae so that they can have different mixes of brood food, allows the workers to recognise the age of a larva and therefore what type of food that larva requires at any particular time, and to cap over the larvae at the correct age. For example: at the time of capping four of the esters seem to be of particular significance and the larva produces between five and ten times as much of them as when it is younger. These brood pheromones have a profound effect on the worker bees, affecting their physiology, so that in colonies with plenty of brood pheromones the age at which a worker starts foraging will be later than where there is little brood. The pheromones will also suppress the production, in the adult bees, of Juvenile Hormone (JH). This is an important hormone which helps to regulate the aging of the workers and, among other things, helps to determine the age at the onset of foraging. In addition, more brood pheromone results in a greater collection of pollen. This is obviously necessary for the production of brood food but we now have an explanation of the underlying control of an observed effect. Put together, these various effects on the workers will result in more nurse bees producing more brood food for the large amount of brood. As well as giving the nurse bees information about the brood, these esters have an undesirable effect as they are used by Varroa mites to detect the correct time to enter cells of the fully-grown larvae. Chemicals which influence the behaviour of another species to its benefit are not called pheromones, but kairomones. It is an interesting concept that a single chemical, or in this case, a mix, can act as a pheromone for the species producing it, enabling the bees to cap over the larvae at the appropriate time while also acting as a kairomone for another species, in this case the Varroa mite. Varroa is attracted by three of the esters, and particularly by methyl palmitate, and it is interesting that, in queen larvae, these three are at about half the strength when compared to workers. There is another ester, methyl oleate, which repels the Varroa mite and this is produced in large amounts by queen larvae. These two facts combine to help protect the valuable queen larvae from being parasitised by the female Varroa mites. On the other hand, the different mix of esters on the drones' cuticle as well as the extended period before capping preferentially attracts the mites to their cells. A great deal of research work has been done recently on the effects of these fatty acid esters and it is becoming increasingly clear that they have a major effect on colony organisation, but, at the same time, it must be clearly understood that they work in conjunction with other pheromones, sometimes being antagonistic to them and at other times working synergistically. It is true to say that the more we learn about colony control the more complicated it becomes and the more questions arise that need an answer. Next month we will look at age polyethism. In plain English that is the development of the individual worker bee in terms of the tasks it undertakes throughout its life.

Tips for photographing insects.

The photographic classes in the honey show actually ask for photos pertaining to beekeeping, which is 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.

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. See the next page, 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 (and photographer) coming close to them. The exception is butterflies. While shooting insects with a macro lens might seem intimidating, start out 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, so keep that in mind when choosing which lens to use. 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 insects, 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.

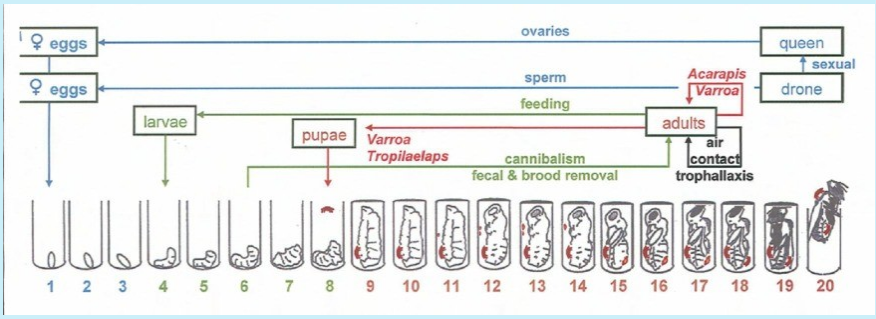
Most cameras will allow you to crop the image and afford some adjustment to brightness and contrast. Insects are more mobile in warm weather, so photograph them in the early morning or evening when it is cooler, and they will be moving slower. The available light at those times of day will also be more 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.

Viruses in Bees by Michael Birt

Bees, like all living things, have a wide range of viral diseases. Most have been known since the 1970's and were, at that time, relatively harmless. Epidemics were transient and rarely at the expense of the colonies. This peaceful coexistence has been disturbed during the past thirty years, mainly due to *Varroa*, but also due to changes in farming and beekeeping practices. This article explains the relationship between bees and their viruses, the impact they cause, and how risks can be reduced.

Viruses can only survive through transfer to new hosts. This does not necessarily have to cause disease. Illness or death of the host without transfer is, from the virus' perspective, effectively suicide. Disease only benefits a virus if it enhances the chance of transmission (such as sneezing with colds).

The figure below describes the various transmission routes available for bee viruses. These can be broadly divided into:
• Oral faecal (through food and faeces, green)
• Sexual (blue)
• Contact (black)
• Through a parasite vector (red).



The diagram outlines the major transmission routes for honey bee viruses in relation to honey bee development stages.

Virus Transmission

Faecal, oral and contact transmission is relatively inefficient: high virus concentrations are required to cause infection. Transmission via mites by contrast is very efficient and generates very high virus titres in the affected bees. Such bees then become also much more infectious through the other transmission routes. This mutual reinforcement of different transmission routes increases the likelihood of an epidemic. Since adult bees are central to most transmission routes, due to their many interactions and mobility, their health is essential to reduce the impact of such epidemic transmission loops.

Virus disease management

The main source of infection is the bees themselves. Through the worldwide trade in bees and bee products, most bee pathogens now have a worldwide distribution. However, the prevalence of disease can vary sharply between countries, due to different beekeeping or farming practices, as well as geographic and climatic differences. There are two components to (virus) disease management:
• minimising the risk of transmission
♦ reducing the virus load in colonies.
♦

Reduce the risk of transmission

This focuses largely on separating infected material from non-infected material. This applies mostly to the bees themselves (queens, sperm, packages, colonies, apiaries) and to lesser degree to equipment (hives, frames, hive tools, extraction equipment, etc.).

Apiary management

Minimising the exchange of bees and material between apiaries is important.

Know your enemies

Routine inspections and thorough knowledge of disease symptoms are essential for identifying problems early. Colonies that develop slower than expected in the spring or fail to accumulate honey in the summer are suspect, as are frames with 'spotty' brood, which can arise from bees removing diseased brood. Diseased colonies should be quarantined and protected with entrance reducers to prevent robbing by healthy colonies.

Reduce the disease load

This focuses on general colony health and disrupting the key transmission routes.

Preventive management

Since viruses are opportunists that flourish during times of stress, the first remedy is to keep your bees happy, healthy and stress free. This boils down to the usual Good Beekeeping advice such as abundant season-long foraging, minimal disturbance, and protection from the elements, a productive queen, adequate ventilation and room for growth. Since honey bees thrive in a diverse (floral) environment, the intensification of farming landscapes and practices has put greater pressure on our bees.

Disrupting transmission

It is important to know the preferred transmission routes of the different viruses. For example, chronic bee paralysis virus is primarily transmitted through close contact. It is therefore often associated with overcrowding and aggression, for example due to over expansion, inclement weather or insufficient forage. Resolving the causes of overcrowding disrupts the transmission and slows or reverses the epidemic.

Black queen cell virus (BQCV) is associated with *Nosema apis*, a disease of adult bees that normally peaks in late Spring. It can be a problem in commercial queen rearing operations where breeder colonies are kept broodless for extended periods. The nurse bees tend to be older in such colonies, and therefore more likely to be infected with *Nosema*, and thus also BQCV, which is transmitted to the queen larvae through the royal jelly.

Critical treatment timing

Deformed wing virus, acute bee paralysis virus and slow bee paralysis virus are actively transmitted by *Varroa* and most likely also by *Tropilaelaps* mites. Controlling the mite population is the key to managing these virus diseases. The most damaging mite mediated virus transmission is to developing pupae when the mite is reproducing. Such pupae produce damaged, non-functional and short lived bees that accelerate dwindling and winter collapse.

Autumn *Varroa* treatment should therefore be at least six weeks (one bee generation) before brood rearing has finished. One week to remove the mites on adult bees, two weeks to clear the mites from the brood and three weeks to purge, from the adult population, those bees derived from mite infested pupae with high virus titres and reduced survival.

Hive Frames.

Although traces of viruses can be found in hive boxes and combs, especially in stored pollen, it is unclear how contagious is this material, given the inefficient oral transmission of most viruses. Frames covered in faeces or diseased brood represent a much more serious risk and should obviously be replaced. Regular comb replacement also helps avoid the accumulation of bacterial pathogens and pesticides. Advances in anti-viral medicines, probiotics, and genetics also offer promise, but follow the basics of good beekeeping still remains the best advice to keep your bees healthy.

HOME MADE APIGUARD.

Michael Birt

INGREDIENTS

100 grams Thymol

200 grams PURA or other pure vegetable fat (no additives, preservatives or emulsifiers)

700 grams Castor Sugar or fine sugar (Not Brown Sugar)

(Sufficient for about 12 colonies)

INSTRUCTIONS

Melt the PURA in a saucepan and allow it to cool until warm to the touch. Put the castor sugar into a plastic container and thoroughly mix in the Thymol crystals until all lumps are broken down. Add the sugar/Thymol mixture to the melted Pura and mix thoroughly until the mixture is the consistency of a paste.

If well sealed the mixture may be stored in the bottom of a refrigerator for up to 12 months.

USAGE

On a piece of grease-proof paper about 10cm x 15cm spread the mixture so that it is about 5mm thick and place on top of the brood frames.

The Crownboard should allow a bee space above the paste. All ventilation should be closed except a 10cm wide entrance. Refresh the mixture every two weeks until the drop falls below 2-3 mites per week.

The ambient temperature needs to be above about 15c In the event of low temperatures (i.e. less than 10c to 15c) increase the area by spreading the mixture more thinly. This stuff is very temperature dependent, too low and it is slow in working - too high and it could interfere with the workings of the hive.

NOTES

I have used this recipe over a number of years on my hives in the UK and have achieved an 80% to 90% mite drop over this period.

Mites do not become resistant to the product

Ugandan Basket Hives (Filmed by the editor

A Bees Brain.

Michael Birt

In spite of their small brain sizes (about one cubic millimetre), honey bees are very smart, with a remarkable ability to learn and recall things very quickly. Their brains are about 20,000 times less massive compared to human brains, and contain less than a million neurons, whilst our human brain has around 80 billion neurons. However, the honey bee brain is actually ten times denser compared to a mammal's brain.

The honey bee brain has an oval shape and is about the size of one sesame seed. The brain is a very sophisticated sensory system which gives them excellent sight and smell abilities. Their small brains are able to make very complicated calculations on distances and optimise route plans for different locations.

How do honeybee brains compare to the fastest supercomputers we have today?
Our fastest computer can process one billion computations per second. A honey bee brain can process one trillion computations per second! But what is the contribution of instinct, pheromones and automatic behaviour? It is true that some bee behaviour is inflexible with instinct guiding their response. But scientists do not fully understand honey bee learning and decision making or what it is that triggers their responses.

Bees learn from older bees how to do some hive jobs. They also use what they learn from experience to decide how to respond in the future. They utilise symbolic communication that is very close to human communication. Bees form some lifelong memories. They know how to conserve valuable energy by hanging almost motionless together in a swarm. They remember, organise their decisions, and process how many landmarks they pass during foraging flights.

Honey bees display fifty nine distinct behaviours that scientists have classified; which compares well with the widely recognised as highly intelligent dolphins, which have only about twice that many at one hundred and twenty three.

One third of a honey bee brain is called Mushroom Body Neurons. This is largely undeveloped in a house or nurse bee and until the bee starts to forage. Then this brain area develops rapidly and is used in critical memory storage. If the hive has a shortage of foragers, some of the nurse bees will switch jobs and become foragers. This job transition, whether triggered by age or social cues, involves changes in thousands of genes in the honey bee brain; some genes turn on and others turn off. It actually allows bees to learn and utilise additional brain power to perform very complex foraging tasks for nectar, pollen, water and propolis.

Bees must make flying decisions, weather condition decisions, visual, scent tracking and tactile decisions. They share perfect directions with their fellow workers, give and follow complex directions the first time, deal with bee enemies and unexpected, unfamiliar situations. Last of all; decide when to sacrifice their life for their colony!

If foraging bees perceive a danger at the location they are foraging, and upon returning to the hive find another bee communicating that location in a ‘waggle dance’, the bee that knows that there is danger will give a ‘stop signal’ by buzzing at 380 vibrations/second and butting with its head the waggle dancing bee who will immediately understand and stop dancing. No more bees will go to this location.

Very Early Beehives

Archaeological proof of the Biblical description of Israel really as "the land of milk and honey" (or at least the latter) has been uncovered by researchers from the Hebrew University of Jerusalem Institute of Archaeology

Amihai Mazar, Eleazar L. Sukenik Professor of Archaeology at the Hebrew University, revealed that the first apiary (beehive colony) dating from the Biblical period has been found in excavations he directed this summer at Tel Rehov in Israel's Beth Shean Valley. This is the earliest apiary to be revealed to date in an archaeological excavation anywhere in the ancient Near East, said Prof. Mazar. It dates from the 10th to early 9th centuries B.C.E.

Tel Rehov is believed to have been one of the most important cities of Israel during the Israelite monarchy. The beehives there were found in the center of a built-up area there that has been excavated since 1997 by Dr. Nava Panitz-Cohen of the Hebrew University. Three rows of beehives were found in the apiary, containing more than 30 hives. It is estimated, however, based on excavations to date, that in all the total area would have contained some 100 beehives.

Each row contained at least three tiers of hives, each of which is a cylinder composed of unbaked clay and dry straw, around 80 centimetres long and 40 centimetres in diameter.

One end of the cylinder was closed and had a small hole in it, which allowed for the entry and exit of the bees. The opposite end was covered with a clay lid that could be removed when the beekeeper extracted the honeycombs. Experienced beekeepers and scholars who visited the site estimated that as much as half a ton of honey could be culled each year from these hives.

Prof. Mazar emphasizes the uniqueness of this latest find by pointing out that actual beehives have never been discovered at any site in the ancient Near East. While fired ceramic vessels that served as beehives are known in the Hellenistic and Roman periods, none were found in situ, and beekeeping on an industrial level such as the apiary at Tel Rehov is hitherto unknown in the archaeological record. Pictorial depictions of apiaries are known from Pharaonic Egypt, showing extraction of honey from stacked cylinders which are very similar to those found at Tel Rehov.

Cylindrical clay beehives placed in horizontal rows, similar to those found at Tel Rehov, are well-known in numerous contemporary traditional cultures in Arab villages in Israel, as well as throughout the Mediterranean. The various products of beehives are put to diverse use: the honey is, of course, a delicacy, but is also known for its medicinal and cultic value. Beeswax was also utilized in the metal and leather industries, as well as for writing material when coated on wooden tablets.

The term "honey" appears 55 times in the Bible, 16 of which as part of the image of Israel as "the land of milk and honey". It is commonly believed that the term refers to honey produced from fruits such as dates and figs. Bees' honey, on the other hand, is mentioned explicitly only twice, both related to wild bees. The first instance is how Samson culled bees' honey from inside the corpse of the lion in the Soreq Valley (Judges 14: 8-9). The second case is the story of Jonathan, King Saul's son, who dipped his hand into a honeycomb during the battle of Mikhmash (Samuel I 14:27).

While the Bible tells us nothing about beekeeping in Israel at that time, the discovery of the apiary at Tel Rehov indicates that beekeeping and the extraction of bees' honey and honeycomb was a highly developed industry as early as the First Temple period. Thus, it is possible that the term "honey" in the Bible indeed pertains to bees' honey.

Cultic objects were also found in the apiary, including a four-horned altar adorned with figures of naked fertility goddesses, as well as an elaborately painted chalice. This could be evidence of deviant cultic practices by the ancient Israelites related to the production of honey and beeswax.

Study of the beehives found at Tel Rehov is being conducted with the participation of various researchers. Dr. Guy Bloch of the Silberman Institute of Life Sciences of the Hebrew University is studying the biological aspects of the finds; he already discovered parts of bees' bodies in the remains of honeycomb extracted from inside the hives. Dr. Dvori Namdar of the Weizmann Institute of Science succeeded in identifying beeswax molecules from the walls of the beehives, and Prof. Mina Evron from Haifa University is analysing the pollen remains in the hives.

Dating of the beehives was done by measuring the decaying of the 14C isotope in organic materials, using grains of wheat found next to the beehives. This grain was dated at the laboratory of Groningen University in Holland to the period between the mid-10th century B.C.E. until the early 9th century B.C.E. This is the time period attributed to the reign of King Solomon and the first kings of the northern Kingdom of Israel following the division of the monarchy. The city of Rehov is indeed mentioned in an Egyptian inscription dating to the time of the Pharaoh Shoshenq I (Biblical Shishak), whom the Bible notes as the contemporary of King Solomon and who invaded Israel following that monarch's death.

A particularly fascinating find at the site is an inscription on a ceramic storage jar found near the beehives that reads "To nmsh". This name was also found inscribed on another storage jar from a slightly later occupation level at Tel Rehov, dated to the time of the Omride Dynasty in the 9th century BCE. Moreover, this same name was found on a contemporary jar from nearby Tel Amal, situated in the Gan HaShelosha National Park (Sachne).

The name "Nimshi" is known in the Bible as the name of the father and in several verses the grandfather of Israelite King Jehu, the founder of the dynasty that usurped power from the Omrides (II Kings: 9-12). It is possible that the discovery of three inscriptions bearing this name in the same region and dating to the same period indicates that Jehu's family originated from the Beth Shean Valley and possibly even from the large city located at Tel Rehov. The large apiary discovered at the site might have belonged to this illustrious local clan.

The excavations at Tel Rehov were supported by John Camp from Minneapolis in the U.S. with the participation of archaeological students from the Hebrew University of Jerusalem and numerous volunteers.

Bee Breeding is very involved.

Michael Birt

Why is breeding better bees so involved? After all, every other food-producing animal that man keeps has been improved out of all recognition, but not bees. The answer lies in the breeding system and genetics of honey bees and in their method of sex determination. Because honey bees are such highly evolved social creatures, the various groups within the colony each has its own distinct function: the queen is the only complete reproductive female and the drones are adapted as sperm providers and really have no other function. Also, the mating system has evolved over millions of years to ensure out breeding.

A queen can mate for only a very short period, probably 4 weeks maximum, at the beginning of her life. She mates on the wing, quite high up in the air and will travel up to 1 mile on one, or occasionally more, mating flights. During the flight she will mate with usually 10 – 20 or more drones, these having collected in large drone congregation areas numbering thousands of insects from many colonies. She will retain about 10% of the sperm she receives from each drone and this will be stored and nourished in her spermatheca, a small round, white structure above the vagina, from which the sperms are released when needed to fertilize an egg, and which will store and nourish around 5 to 6 million sperm.

These will have to last her for the rest of her life. She will use 200,000 of these sperm each year so her supply should last her quite easily, even if she lives for 5 years or so. The drones can only mate once and die immediately.

So far, so good, we are beginning to see some of the problems, and a major one is that honey bees will not mate naturally under any other conditions. The method they use is well suited to their lives: mating with many drones, each of which can only mate once, brings a whole range of different characteristics into the colony contributing to the colony make-up and conferring many advantages. Not all will be favourable of course and some will suit the bees but not the beekeeper.

The other major advantage of the mating system is the avoidance of closely-related drones as mates.

All the characteristics of a honey bee are passed on from one generation to another by the genes of the individuals concerned. I think we are all very familiar with this concept and the fact that genes are made of DNA. The genes form chromosomes, which are rod-like structures only visible when cells are dividing, and in the honeybee there are 32. We talk of them as 16 pairs, because the members of each pair (homologous chromosomes) resemble one another in shape and size and can be thought of as similar to identical twins. The genes are also in pairs or series (called allelomorphs or alleles for short) and at a particular place on a particular chromosome there will be 1 gene from the appropriate pair or series.

The genes in the pair or series will control one characteristic, eg. The synthesis of one protein within the body of the bee, but the alleles themselves may not be identical and may produce different effects.

Now back to our sex determination. There are a number of sex genes carried on a particular chromosome and although there are many of them, (nobody seems sure how many, some say about 18, others say over a hundred), an individual egg or sperm will only carry one from this series.

If an egg remains unfertilised, so developing into a drone, it will not receive the chromosomes and genes from a sperm so it will only have 16 chromosomes. As the egg develops into an embryo, and finally an adult drone, the cells divide and every cell in the body of a drone will contain only 16 chromosomes. For those of you who like long words he is described as hemizygous. He will therefore inherit, from his mother, 1 sex gene out of the series. This is what determines that he is a male. Females, on the other hand, develop from fertilised eggs. An egg and sperm fuse, each contributing 16 chromosomes giving 32 chromosomes and all cells in the body of that individual will have 32 chromosomes.

Now we come to the clever bit, because, if the two sex alleles in this individual are different she will be a female but if they are identical a drone will be the result. We call the full complement of chromosomes (32) the diploid number and the half complement (16) the haploid number. All females are therefore, said to be diploid and all normal drones are haploid, but our drone with 2 sex genes is called a diploid drone. He has 32 chromosomes but the 2 identical sex genes mean that he will develop as an identical drone that will be infertile.

He will therefore, be eaten by his sisters as soon as he hatches from the egg. Clearly, if a queen were to mate with just 1 drone that carried the same sex gene as one of hers, up to half of her fertilised brood would die and this would seriously deplete the colony. Mating with many drones minimises this effect.

Incidentally, some people struggle with the idea of a series of genes but, while one queen or worker can only carry two from that series and a normal drone carries one, the rest of the genes from the series are distributed throughout the honey bee population.

BEE KEEPERS' QUARTERLY.

The Bee Keepers' Quarterly published by Northern Bee Books is a somewhat weightier magazine that BeeCraft.

It carries articles on research; articles from bee keepers from around the world, (the editor lives and keeps bees in Messinias in Greece); articles on bee health; bee keeping development; the bee keeping season and much more besides.

Recent features have included colony losses; making a 'Langstroth' top bar hive; overwintering; new technology; Travellers' Tales and articles 'for the workshop', and there always a number of book reviews.

The normal cost is £28.00 pa, but through the Association it is just £18.00pa.

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Himalayan Honey Hunter coming home with his crop

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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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