Beetalk

General info and news about bees
March 2017

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 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.

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

birt_192@hotmail.co.uk

PLEASE SUPPORT THE FOLLOWING.

NORTHERN BEE BOOKS

OVER THE PAST TWENTY YEARS OR SO WE BEEKEEPERS HAVE HAD TREMENDOUS SUPPORT FROM NORTHERN BEE BOOKS. WE WOULD LIKE TO THANK THEM BY PUBLICISING THEIR WEBSITE WWW.BEEDATA.COM

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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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From EH Thorne's online catalogue 2010 - other sources are available

The Winter Cluster

Honey bees play it both ways during the winter - they act both as 'cold-blooded' insects, and as a 'warm-blooded' super organism.
There are a number of reasons why this is advantageous. An individual bee reaches 'chill coma' at about 44°F (6.7°C), and will die if held at the edge of freezing for a few days. So the cluster must generate and conserve enough heat to keep all members of the colony at least above that temperature for the duration of the winter.
This process requires only a small amount of honey consumption - less than a pound a week even under severely cold winter conditions.
The cluster must also maintain the ability to warm up enough to move, to reach new areas of the hive in order to access their food stores.
This is how the winter cluster forms:

- There is a fairly loose core of bees in the centre that maintains a temperature of about 80-95°F (26-35° C). In small clusters, the core temperature may drop to 60-70°F (15- 20°C).
- Around the core, there is a tightly packed layer of bees that maintain a temperature of about 56°F (13° C), which is a critical temperature, below which the cluster will die.
- At the very outside, or 'mantle' of the cluster, individual bees do not allow their body temperatures to drop below about 44°F (6.7°C) which is just above their 'chill coma' temperature.
- These bees may burrow deeper into the cluster from time to time and very rapidly raise their body temperature, then return to the mantle after several hours. And if a bee's temperature falls below 45°F (7.2° C) it is no longer able to flex its muscles to generate heat.
- The actual cluster size is dependent upon the ambient temperature - it can expand or contract to an amazing extent.

We know that bees shiver to produce heat, but a recent article by Keith Delaplane in The American Bee Journal, suggests that young adult bees cannot shiver and have a low cold tolerance. Consequently they naturally gravitate to the centre of the cluster, where it is warmer. Older bees, however, are able to generate heat by shivering their flight muscles, so they move away from the centre, to form the middle and outer layers of the cluster, called the mantle.
As the ambient temperature drops, all the bees cluster ever more tightly, and it is the mature bees in the mantle that are responsible for maintaining the correct temperature, not the young bees at the centre.
The bees (and queen) in the heart of the cluster are so well insulated by the outer mantle that overheating then becomes a problem! The young bees then move outwards, opening channels in the mantle which allows warm air out to warm up the older bees and cool air in to lower the interior temperature.
As they age over the winter, the young bees become more tolerant to cold, so the chill tolerance of whole cluster increases as the winter progresses.
There are two vital temperatures that control a cluster; - 95°F (35°C) in the inner core, which attracts the young bees, and 59°F (15°C) on the outside layers, which is the minimum at which flight muscles can be vibrated. The very outside bees can withstand near freezing for a few hours before they succumb to hypothermia and fall off, their insulation value going with them. Eventually the cluster may become too small to produce enough heat to survive, which is why a strong colony will usually winter better than a small one.
The core of the cluster is an otherworldly environment. The bees actually modify the atmosphere in order to allow themselves to enter into a 'hypoxia-induced ultra-low metabolic rate'. They restrict ventilation to let the oxygen content drop from the normal 21% down to only about 15%, and allow CO_2 to rise to 5-6% (up from 0.038% in normal air).
This atmosphere would be toxic to humans, but allows the bees to go into a form of suspended animation.
Water loss in the winter cluster is very important. Insects lose water vapour with each breath, just as mammals do, but they have no source of drinkable water within the winter hive. In cold winter areas, the extremely low moisture content of the air means that when the cluster creates heat, the relative humidity of the cluster atmosphere drops extremely low. Insects can hold their breath, (for up to a day at a time), in order to prevent water loss, and probably bees in the cluster do the same.
When animals and bees metabolise carbohydrates, such as sugar, they create 'metabolic water' as a by-product. If the bees can conserve this metabolic water enough to be in excess of that lost to respiration and any body waste, then they can actually realize a net gain of water.
So, how much water do bees get out of honey?
A pound of honey at 83% sugars, contains
0.17 lb of water, and creates 0.48 lb of metabolic water, for a total of 0.65 lb of water freed from each pound of honey consumed.
That means that a colony typically consuming
0.8 lb of honey a week, would produce about a half a pound (1 cup) of water per week.
It may be a challenge for a large colony to live on this amount of water so there is good reason to provide an available source of water, together with hive insulation, and good hive ventilation to help overwinter your bees.

A Winter's Tale.

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

In late summer and autumn the queen continues to lay, although at a reduced rate. The bees that develop from these eggs will have a lower metabolic rate and little work to do as there are fewer larvae to feed and the available forage is meagre. As a result of this they remain 'young' and do not follow the normal pattern of development and aging which we see throughout the summer, when approximately 3 week old bees graduate from in-hive duties to foraging and, as a result, age and die in about 2–3 weeks.
It is important to realize that the aging process in a worker bee switches when that bee becomes a forager. At that point in her life, a number of changes take place: her protein levels drop, her Juvenile Hormone (JH) levels rise and she is then on the slippery slope to death. Our winter bees do not make this transition at 3 weeks, but continue in their physiologically young state until the spring, when they kick-start the massive colony growth which precedes the swarming season.

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

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

One of the principal stored proteins is vitellogenin, and quantities of this are also stored in the hypopharyngeal glands, which remain plump. In the spring, as new larvae need food, all this stored protein is converted into brood food. With their protein reserves depleted, our winter bees become foragers, the aging process starts and they die.
What goes wrong? Disease is the biggest problem. *Varroa* has been shown to change the physiology of the winter bees so that they do not store adequate protein, but the main effect of all adult bee diseases is to shorten the life of the I infected bee. *Varroa*, *Deformed Wing Virus* (DWV) and *Nosema*, our 3 main culprits, can have a devastating effect on the colony, killing many of the winter bees before the spring bees can build up sufficient numbers to take over. This leads to the classic situation of colony deaths in February and March.
Colonies can also die at this time of year if they run out honey stores, as the increasing population of young bees in the colony puts greater demands on the available stores.

This is all of practical importance to us as beekeepers. The winter bees must be protected by ensuring that they do not suffer from high levels of *Varroa* during their development. This means treating early, as soon as the honey crop can be removed in August, if *Varroa* numbers have not been controlled by husbandry means during the active season.

It may present particular problems for those taking bees to the heather, as any treatment applied after the return of these colonies will be too late to be effective. They need to go on their travels with low *Varroa* counts. Controlling *Varroa* to keep it below the1000 mites/colony level will also control the viruses, particularly DWV. *Nosema* has to be monitored and controlled during the
spring/summer by testing the colonies and getting them onto new comb if necessary. There is no chemical treatment available.
Progress can be made by breeding from colonies not showing the disease and removing those queens which are susceptible.

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

Question. I've heard that applying smoke to bees triggers an instinctive reaction which causes them to fill their honey stomachs. If this is the case, why is it sometimes necessary to apply smoke more than once during an inspection – do the bees 'fill up' when the smoke is first applied, and then empty when it has cleared? Or does the ingestion of honey not play any part in the process - do they just disappear into the brood chamber to avoid the smell, temperature or mechanical action of the smoke?

Answer. If you smoke a colony a minute or so before opening it, when you gently take the combs out you will see rows of bees busy feeding from the contents of open cells of nectar. Not all the bees have this reaction but a significant number do. So why are they doing it? The theory is that, being a forest dwelling creature, bees interpret smoke as being a forest fire that may force them to abandon their nest and have to find a new home.

The most urgent task when they do find a new home will be to build comb and I suspect that the individuals that are busy filling their tanks with nectar are mainly bees of wax making age. In fact, they are doing exactly the same thing that bees do just prior to swarming. A few hours later bees that have filled-up with nectar will have produced wax scales ready to start comb building. As I understand the physiology of comb building, gorging on nectar, retaining it and passing it on to the digestive system, inevitably activates the wax glands. So I presume that, when the emergency is over and that awful, smoke-puffing beekeeper has gone away, they put the nectar back thus avoiding the production of wax that is not wanted.

We smoke bees mainly to suppress their defensive behaviour and the question is, how does this work? There are several answers, some more convincing than others. Firstly it is said that a bee full of nectar is unable to flex its abdomen sufficiently to get in the right position to sting. I think this is anatomically correct but do the bees that do most of the stinging - the guard bees - actually stuff themselves with nectar? I am not sure they do because their main attention is, quite rightly, on defence. So I think this explanation is rather suspect. Smoke is also said to disguise the alarm pheromone produced by the bees when they sting and, as the practice of smoking the place where a sting has been lodged (eg. a glove) seems to work, I think this has a sound basis in fact. Finally, we use puffs of smoke to drive the bees and this works because they presumably associate smoke with fire and their instinct is to move away. Incidentally, this also works with cattle as I found out one day when I was trying to gather a swarm that had settled on the ground in a field containing a very inquisitive herd of bullocks. A good puff of smoke up their nostrils enabled me to keep them at a safe distance until all was safely gathered in. The smoker is a tool that is frequently used poorly and puffing great clouds of smoke in the hive is not advantageous - much better to use a little smoke then to wait whilst the bees react then calmly and gently inspect the colony, using the smoker as little as you can manage.

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HONEYBEES COMMUNICATE ABOUT DANGER Honeybees warn each other to steer clear of dangerous flowers where they might get killed by lurking predators. Scientists made this discovery by placing dead bees upon flowers and then watching how newly arriving bees reacted to the danger. Not only do the bees avoid the flowers, they then communicate the threat when they return to the hive via their well-known waggle dance.

The discovery is published in the journal 'Animal Behaviour.' The honeybee waggle dance is a surprisingly sophisticated mode of communication. When foraging bees return to the hive, they waggle their bodies in a complex dance first deciphered by biologists more than 40 years ago. The angle and direction of the forager bees' waggle dance conveys how far and in what direction other more naive bees need to fly to reach flowers that will provide plentiful sources of food. Honeybees are also more likely to waggle and dance when returning from food sources containing high concentrations of sucrose.

Now scientists Kevin Abbott and Reuven Dukes of McMaster University in Hamilton, Ontario have found that honeybees also use the waggle dance warn other bees to avoid danger. They trained honeybees to visit two artificial flowers containing the same amount and concentration of food. They left one flower untouched, making it a "safe" food source for the bees. On the other flower, they placed the bodies of two dead bees, so they were visible to arriving insects, but would not interfere with their foraging. They then recorded whether and how the bees performed a waggle dance on their return to other members of the hive colony.

On average, bees returning from safe flowers performed 20 to 30 times more waggle runs that bees returning from dangerous flowers. That shows that the bees recognise that certain flowers carry a higher risk of being killed or eaten by predators, such as crab spiders or other spider species that ambush visiting bees. What's more, they factor this risk into their waggle dances, tempering them to steer their colony mates away from flowers that might be dangerous.

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I*NDUSTRIAL FARM COLONY* London Daily Mail, 1881

Lady Henry Somerset, the noted temperance worker, like many other sensible as well as titled people, believes in encouraging bee-keeping. Her ladyship, after giving particulars of the various branches of work carried on at her Industrial Farm Colony, at Reigate, goes on to say "We believe in work but we believe that it should be varied, and as far as possible in the open air. Last year, in the 300-foot glasshouses we grew a good crop of tomatoes. All the pruning and picking was done by the women. The bees, however, are really our most successful venture. They have already repaid the whole of the original outlay, and given a profit as well. This season the eight hives yielded 300 pounds of honey and the colonies were increased by swarms from 8 to 11, so that next season we ought to gain a very good profit, if the season is favourable."

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MISTAKES IN BEEKEEPING American Bee Journal, 2nd September 1885

- It is a mistake to invest very largely in any business that you are not acquainted with.
- It is a mistake not to feed bees before blossoms appear in the spring, to encourage breeding.
- It is a mistake not to have your colonies strong at all seasons of the year.
- It is a mistake to neglect to put on supers early enough in the spring, if comb honey is required for breeding purposes.
- It is a mistake not to use comb foundation; for by its use we can always depend upon straight combs and greater conveniences for handling.
- It is a mistake to neglect to remove all full boxes or sections as soon as properly sealed. Bees sometimes soil them by travelling over them with their dirty feet.
- It is a mistake not to supply an abundance of room for them to store their surplus, when honey is plentiful. Bees often remain idle for want of space to store their treasure.

Beekeeping received a lot of interest during WWII and several excellent beekeeping books were written during this period. The following extraordinary account does rather put misgivings about sitting the Basic Examination into perspective.

"Many associations have small beginnings and 'Captive Drones' was no exception. From a small, but enthusiastic group of students under CSM Savage, MM, the craft and science of agriculture was first studied in Stalag 383, on 14th October 1942. Conditions of study were far from agreeable but the group gradually gathered momentum and in the spring of the following year was over fifty strong. The need for free discussion and the possibility of obtaining a stock of bees brought about the formation of an association, under the Presidency of Captain C F Grant, and on the 3rd May 1943 fifty-three members signified their assent. A week later the name of 'Captive Drones' was approved. "From the date of inception the association has not looked back and on the 15th May a hive of bees was obtained from Hohenfels. Very shortly an apiary was established under the associations care. For this purpose the economic subscription of ten cigarettes or a bar of soap was duly approved for maintenance purposes.

Thus the very generous loan from a true beekeeper, for the duration of the war, enabled the students to have practical and theoretical instruction. Meanwhile the periodical meetings provided opportunities for theoretical discussion and every possible aspect of the craft was considered. The interest was now increasing daily, enhanced no doubt by 'the apiary on the hill' and by the 14th July 1943 membership was well over the hundred mark. A week later the problem of winter-feeding was discussed and the members agreed to give up six ounces of sugar per man so that the bees might winter in comfort.

During the same period many demonstrative manipulations were made by the Chairman and Instructor and not a few were amazed that bees could be handled so easily. The warm weather brought a glut of operations wherein swarms were hived, Queens reared, hives inspected etc. The summer waned and winter approached with the examination of candidates for the BBKA Craftsman Certificate. These examinees may be termed as the 'pioneers' of such examinations.

In the meantime, the executive was strengthened in October by Captain Mackay and Captain Crawford as Vice-Presidents. From this date despite inclement weather, studies carried on in preparation for the winter examination and on 15th January 1944 no fewer than 32 candidates presented themselves for the Craftsman Certificate and two for the Expert Certificate. At the same time the hives in the apiary were packed down for the winter, they gave an outward appearance of still life.

The Christmas vacation temporarily halted the associations activities until 16th February when more than twenty new members were welcomed and official notification of affiliation was received with the significant words 'captive you may be but drones never'.

Spurred on by these heartening words the Chairman commenced upon the prodigious task of individually examining over fifty suitable candidates for the Oral Section of Junior Craftsmanship. On the 28th March the association was gratified to learn that eight candidates were entitled to the designation 'Craftsman'. So concluded a very successful years bee-keeping, due in no small measure to the Chairman's initiative and resourcefulness, the Presidents never failing interest and the invaluable work of the BRCS and the YMCA."

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ROOM IN A NATIONAL BROOD CHAMBER FOR THE REQUIREMENTS OF A GOOD QUEEN?

I am of the opinion that a queen should have the use of more than eleven British Standard combs when she is in full lay and also during the autumn when space is required for winter stores of honey/sugar syrup/pollen,rearing 'winter' bees and for the bees themselves. The only time in which I consider eleven BS combs to be desirable is during the summer when the need for bulk brood rearing has passed. I reduce my colonies to a single brood chamber about 20 June because eggs laid after that time will not produce foragers for another six weeks, which will be into the first week of August. If colonies are maintained on large brood chambers during the main honey flow, and the weather is poor, unnecessary brood will continue to be reared and any surplus honey will be stored in the brood chamber. Access to a single brood chamber will force the bees to cut back on their brood rearing and store any surplus honey in the supers.

This works for me because I only take a few stocks to the heather. The heather stocks require to be boosted by uniting them to a large nucleus containing a young queen and a force of young, fresh, bees before going to the moor.

Queens usually reach their peak of egg production in May/June during the spring honey flow. If they are confined to a single brood chamber in which to breed, the queen will be restricted in her egg laying, the nest will be congested which will prevent queen substance being adequately distributed to all bees and swarming will be the inevitable result.

Let us consider the following facts and assumptions. If we count the number of complete cells visible on a single side of a sheet of foundation after it has been inserted into a DN1 British Standard frame we will see that there are 41 rows containing 56 complete cells. This multiplies out at 2296 (say 2300) cells on each side of a newly drawn, perfect, comb. We all know that combs do not remain perfect for too long and if they are drawn out in a single brood chamber there is often a space between the comb and the bottom bar of the frame. In a National hive, if we ignore the outside of the two outside frames which seldom contain brood, we have 20 sides available which equates to a total of 46,000 cells.

Now consider the assumptions:
Assume per side Total Cells
25 drone cells 500
400 honey cells 8,000
400 pollen cells 8,000
125 holes; misshapen cells; comb bottoms; etc. 2500
100 cells being cleaned and prepared 2000
Grand total 21,000

Therefore our initial 46,000 less 21,000 (as detailed above) leaves 25,000 cells available for the production of worker brood. The books tell us that a good queen at her peak is capable of laying 1500 to 2000 eggs per day. If we take the lower figure, this equates to 31500 over a 21-day period. This means that she is 10500 cells short; the equivalent of 4.6 comb sides or, say, 3 frames. Remembering that in a second brood chamber the outside of the two outside combs would be unlikely to contain brood, this would indicate that 4 extra frames would be required, making a total of 15. That is for a queen laying 1500 eggs per day. She may be capable of laying more. From the above I would argue that two BS brood chambers, each containing eight combs flanked by dummies would be required. In practice, I winter my

LIFE OF A HONEY BEE.

Bill Ainsworth.

A Queen Honey bee can live for three or even four years.

The drone dies when it mates or when the season comes to an end. Occasionally, when the bees are not happy with their Queen, he is allowed to live through the winter and into the next season.

The worker, whose labours are equally important for the well-being of the colony, has a life span of no more than about six weeks during the summer months. In winter she can live as long as six months.

WHY SUCH A SHORT LIFE FOR A KEY MEMBER OF THE HIVE?

It is generally supposed that the worker is worn out by her labours. However, the queen labours in the summer months, producing her own body weight in eggs every twenty-four hours in order to replace the tens of thousands of short lived workers.

The drone also labours during this time. Whenever the weather is suitable for mating, he is constantly flying, searching for virgin queens. Without any rest from the moment he leaves the hive until he returns, a drone dies when he has mated or when the season comes to an end and the hive no longer needs him. He is then thrown out of the hive and starves to death. The queen can produce more drones next year.
So labouring is probably not the only cause of this discrepancy in life span.

SYMBIOSIS

There is one cause that comes to mind, about which we see very little discussion and very few, if any, comments or articles. This is the relationship between the *working* honey bee and the flowers. The bee depends on the flower for food and the flower depends on the bee for fertilisation. Symbiosis is the name for this relationship between bees and flowers. In common language it means 'You scratch my back and I'll scratch yours'. It is an agreement between flowers and bees that was formed millions of years ago and is vital to both bees and flowers and, for that matter, to all life on earth, for without flowers there would be a dramatic shortage of plant life which feeds the majority of most life forms on earth.
One way or another. Symbiosis is vital for life on earth. The relationship between bee and the flower is not simply distributing random pollen, it has to be the pollen of the specific plant species - the foraging bee must stick with one type of plant. This relationship must be locked most securely. I would suggest it has been locked and securely fixed by natural selection in the DNA of bees and flowers.

The flowering time of each particular flower of something like two or three weeks, has to be locked into the lifetime of the new forager bees. A bee begins her foraging life working the flowers of a particular flowering plant and only visits that particular plant or a plant of the identical species and no others for the rest of her life. When that plant stops producing pollen then the foraging lifetime the bee is about over, her job is done, her life is about to end. A new batch of worker bees will take over should that particular plant continues to flower. If the flowering ends before the bees working those flowers come to an end, the bees will find new flowers to work until they shortly end there days. As new plants come into flower, new bees will be starting to forage. So we have new flowers needing the fertilisation by pollen of the same particular species and new foraging bees that will work only on that group of plants and die about the time the plant stops producing pollen.

It is normal to see bees carrying different pollens of different colours into the hive. It is a sign that all is well, as the bees need different pollens to keep them healthy. Just as humans need different foods for a healthy diet. I believe that the bees carrying green pollen, only bring in green pollen and other bees only bring in yellow pollen or brown or whatever, each bee faithful to the symbiosis agreement.

Apart from the last paragraph I'm fairly sure of my facts. I have no way of confirming the truth of what I say on individual bees keeping to the collection of individual pollens amongst the bees in the same hive It would take some research to confirm this, research which is beyond my abilities.

I have just this very day come across some work on this unusual subject in a very old book I have had in my possession for years and started to read through again

If this story is correct, and all fits together the short life span of a working honey bee has a much more reasonable explanation in the terms of Darwin's theory of the conservation of the fittest. Sort of!!

A Handy Checklist.

Over the last month or two, I have had a number of calls from new beekeepers phoning to check about problems which they have encountered with their bees this season. As always, my advice is to get to know what normal healthy bees and brood look like and check if you are unhappy or not sure about what you see in your colony.
Inspecting the brood combs of a honeybee colony is the only way to determine the health and general condition of the colony. However, you have to know what you are looking at and what it means in order to make a diagnosis.
In general a healthy brood comb simply looks 'looks healthy'. The brood capping's have a 'digestive biscuit' colour; the larvae are white, glistening and 'fat'. The capping's of the brood cells are uniform and the overall pattern is solid, with few holes. A good queen will start laying eggs in the lower centre of the combs and radiate out from there. Once the oldest brood emerges, the queen lays in those cells, and the youngest brood on the comb will now be in the centre. Once the brood-rearing cycle gets underway in the spring or following the introduction of a new queen, all stages of brood should be found at each inspection.
I came across this check list recently which would be helpful when inspecting your colonies. Here are some conditions you may observe during your brood inspections and their possible causes:

No eggs, no brood present

(a) Not brood-rearing season. (b) No queen. (c) New queen not yet laying. (d) Extended shortage of pollen.

Test for Presence of a Queen

No eggs, but brood present

(a) Brood-rearing ceased - end of the season. (b) Queen has died or colony is preparing to swarm. (c) Lack of pollen curtailed brood-rearing.
If there are no eggs and you can't determine if there is a queen present, put in a brood comb with young larvae from another colony. Check back in three days; if the suspect hive starts queen cells, it has no queen.

Eggs present, but no brood

Brood-rearing has just resumed after being halted for some reason.

Wet-looking pollen - in the centre of the brood nest

If there is no queen and during the off-season, pollen may be stored in the centre of the brood nest and can take on an unkempt look - wet or glazed over. When the workers anticipate needing the pollen to feed brood, they move the pollen and freshen it up and it has a dry look.

Clean, empty cells - in the centre of the brood nest

The opposite of the wet-pollen look. When the workers anticipate that brood cells will be needed for eggs, they move nectar and pollen out of the way and give the cells a polish.

Too many eggs per cell

(a) Young, inexperienced queen, usually settles down quickly to laying one egg per cell. (b) Something happened to queen and laying workers developed.

Scattered brood

Raised capping's on worker cells

The capping's look like the ends of bullets. Cause: Drone brood is developing in worker cells.

Raised capping's in drone cells

Normal drone brood has a 'bullet' look, but not as pronounced as when it is in worker cells. Normally, queens lay unfertilized eggs in the larger (both in circumference and depth) drone cells. These are frequently found around the bottom edges of the brood comb and in areas where the comb has been damaged. The presence of some drone brood indicates a vigorous, well-nourished colony.

Queen cells

Queen cells are constructed along a vertical plane, as contrasted with the horizontal plane of worker and drone brood cells. They somewhat resemble peanuts (in the shells).
(a) Queen cells near the centre of the comb, growing out of worker brood cells these are replacement cells the workers have developed in emergency loss of queen. (b) Queen cells everywhere, particularly near bottom of comb. This is swarm preparation - the old queen will soon depart with about half the bees (called the 'prime swarm').
Tip: For a quick check of swarm preparation, in a hive with two brood boxes, break the boxes apart and look along the bottom bars and bottoms of the combs in the top box. Most colonies preparing to swarm will show cells along comb bottoms.

Dead larvae (not white)

(a) Chilled due to cold snap (usually in spring) when there are too few adult bees to keep the brood warm. (b) Died due to lack of care for some reason. (c) Disease: Sacbrood, American foulbrood, European foulbrood. Call the Bee Inspector. (d) Pesticide damage

Mummified larvae

Older stage larvae turn white and hard. This is probably Chalkbrood.

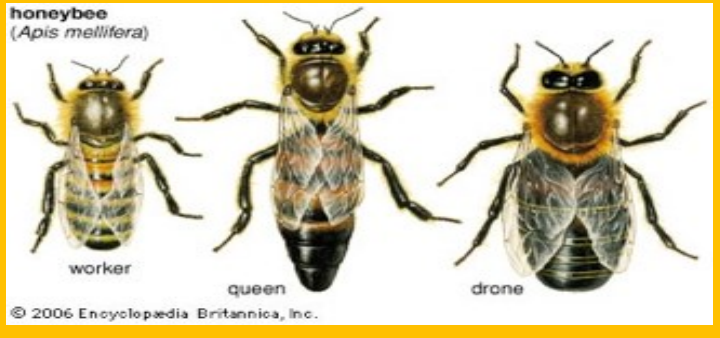
Mouldy pollen

Soft, white stuff in pollen cells ? probably due to insufficient hive ventilation.

What about mites?

After some training, you can pretty easily identify *Varroa* mites on adult bees' abdomens and on your open mesh floor tray. Also, you can uncap pupae and pull them out of the cells and check for dark *Varroa* attached to the white pupae. *Varroa* are especially attracted to drone brood and can often be found in the bottom end of the cells from which drone pupae are extracted. They may run out of the cells as pupae are being extracted.

Know your Bee



Discovery of new honey bee sub species in China.

A new apis sub species has been reported from Hunan Province in the south west of China.

Doctor Won Hung Lo from the Chinese Third World Institute of Terrestrial Science and Professor Prapsil Nokobolokov from the Russian Federation Of Organic Land Sciences have discovered a sub species of *Apis mellifera,* they have named A.M. sinensis. The dark-bodied bee is about one third larger than *A. M. mellifera* and lives at a higher altitude. Unusually, its honey storage combs lie horizontally rather than vertically and the bee has feet adapted with a small plate behind the hook that terminates most bees' feet. This spreads the weight of the bee when it walks across the tops of the combs and prevents it sinking into the honey filled horizontal combs.
Research is being undertaken to see if it possible to replace the horizontal comb with jars so that the bees can fill them directly, thus avoiding the need for extraction.
South West China News Agency.

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Diagnostic Radio-entomology A Presentation at UCS, Ipswich, by Mark Greco
Mark Greco is Australian born and has spent 25 years as a diagnostic radiographer at The University of Western Sydney-Hawkesbury. He has recently been researching in Bern, and is on his way to Bath University for several months. He has developed an amazing new way of looking inside bees and bees' nests. Using x-ray computerised tomography he produces 3D images which can be viewed at any cross-section. This means he can look at insects non-invasively.
He is a beekeeper at home, of Australian stingless bees (*Trigona carbonaria*), which are used as pollinators in glass houses. These bees are difficult to study as they are kept in small box hives which have to be taken apart to inspect. Splitting the boxes breaks the comb, spreads honey everywhere and inevitably kills bees when put together again. Mark found it was far less invasive to use a CT scanner to scan the whole hive. This was less disruptive and gave a more reliable picture. **When using this technique to study *Apis mellifera* in winter clusters, it became apparent that at low temperatures (-20°C) a cluster is not rugby-ball shaped as many previously thought, but a cone, point down, thus using heat as efficiently as possible. Also, the queen is not central but continually on the move. Also that honey is stored in different locations for different sugar concentrations and may also be affected by agrochemicals.** There is much more to learn from this. It is now possible to measure with great accuracy, the amounts of pollen, honey, wax, larval cells, etc., to determine the population point a colony can recover from and what level of humidity creates ideal conditions for virus infections. The dose of radiation for one scan is minimal and does not affect the bees.

For so work the honey-bees,
Creatures that by a rule in nature teach
The act of order to a peopled kingdom.
They have a king and officers of sorts;
Where some, like magistrates, correct at home,
Others, like merchants, venture trade abroad,
Others, like soldiers, armed in their stings,
Make boot upon the summer's velvet buds;
Which pillage they with merry march bring home
To the tent-royal of their emperor:
Who, busied in his majesty, surveys
The singing masons building roofs of gold,
The civil citizens kneading up the honey,
The poor mechanic porters crowding in
Their heavy burdens at his narrow gate,
The sad-eyed justice, with his surly hum,
Delivering o'er to executors pale
The lazy yawning drone.
Henry V, I. 2

Bees play Doctors and Nurses.

As we approach the Winter and consider the benefits of a flu jab and perhaps visit our own nurse to receive the vaccination, it is interesting to reflect that honey bees also have doctors and nurses.

Sick bees may be nursed by doctors ! Bees are among the most industrious creatures on the planet, but honey bees still struggle when they are ill. Once a disease takes hold inside a hive, the bees can become sluggish and disorientated and many may die.

Now it seems honey bees may have a way of helping to keep their workforce healthy - by employing bees that feed special 'medicinal honey' to other members of the hive.

A group of worker bees called 'nurse bees', if they are infected with a parasite, selectively eat honey that has a high antibiotic activity, according to Silvio Erler of the Martin Luther University Halle-Wittenberg, Germany and his colleagues. These bees are also responsible for feeding honey to the larvae and distributing it to other members of the colony.

So it's possible they are the hive's doctors, prescribing different types of honey to other bees depending on their infection. If that is true, it could be a big part of how bees fight disease. In Erler's study, nurse bees infected with the gut parasite Nosema ceranae were given a choice of honeys.

Three were made from the nectar of the plants black lotus, sun-flower, and linden trees; whilst a fourth was given honeydew honey made from the secretions of scale insects or aphids.

Each of the honeys was known to have antibiotic activity. Bees with greater levels of infection tended to eat more of the sun-flower honey, which had the strongest antimicrobial activity. It reduced the level of infection in the bees that ate it by 7%, compared to the honey from the linden trees.

"Honeys are full of micronutrients, alkaloids and secondary plant compounds that are good for both bees and humans alike," says Mike Simone Finstrom of North Carolina State University in Raleigh. One study suggested they can increase the activity of honey bees' immunity genes, boosting their ability to fight disease.

A separate study from September by Erler's group suggests different honeys are effective against different diseases. While sunflower honey is good at preventing the growth of bacteria that cause American Foul Brood in bees, it is less effective against bacteria associated with European Foul Brood.
However, linden honey was more effective against these bacteria.

Perhaps after all we should buy each of our bee colonies a jar of genuine Manuka honey for the New Year!!

Flying is Hard Work (for Bumble Bees)

In flight a bumble bee flaps its wings 200 times per second (which equals 12,000 rpm), roughly equivalent to the speed of a high-revving motorbike engine. This generates a lot of heat, and comes at a cost: bumble bee flight requires a lot of energy.

A running man uses up the calories in a Mars bar in about one hour. A man-sized bumble bee (terrifying thought) would exhaust the same calories in less than thirty seconds.

Hummingbirds are often thought of as having exceptionally high metabolic rates, but a bumble bee's is roughly 75% higher.

They eat almost continually to keep warm, and raise their temperature to 30°C to fire up their flight muscles to be able to fly. Food energy is essential.

A bumble bee even with a full stomach is only ever about forty minutes from starvation.

If a bumble bee runs out of energy, she cannot fly, and if she cannot fly, she cannot get to flowers to get more food, so she is doomed.

SCENTLESS SPRING National Geographic News

Soon it may be harder to stop and smell the roses. Growing levels of air pollution from power plants and automobiles have reduced the potency of flower fragrances by up to 90 percent as compared with preindustrial levels in the United States, a new study has found. The trend is unpleasant for human noses, but may be life-threatening for pollinators such as bees and butterflies.

"Many insects find flowers by detecting the scent produced by those flowers," said Jose Fuentes, University of Virginia. "This pollution makes it increasingly difficult for pollinators to locate the flowers and feed on their nectar." Flowers also stand to suffer when this symbiotic relationship falters. If insects can't find enough flower-based food to survive, their movements won't pollinate plant species.

Flowers produce volatile scent molecules that bond with pollutants such as ground-level ozone, in the process breaking down the plants' sweet smell. With more pollution in the air, the aromatic molecules don't remain potent as long and travel shorter distances on the wind. The new study's model suggests that in the mid-19th century, when pollution levels were first recorded, scent molecules would have been able to travel some 1000-1200 metres. Today, in the polluted air found downwind of large metropolises, scents may only make it some 200-300 metres. The impact is especially pronounced during high-pollution "code red" days in summer. "Lots of vehicles are releasing nitrogen oxides," Fuentes said. "When the gases are in the presence of sunlight they are converted into these molecules that we call ozone -- one of the main pollutants that we find in the summer months. Fragrances are overwhelmed by it.

BEES' TINY BRAINS BEAT COMPUTERS

Researchers found that bees could solve the 'travelling salesman's' shortest route problem, despite having a brain the size of a grass seed.

Bees can solve complex mathematical problems which keep computers busy for days, research has shown. The insects learn to fly the shortest route between flowers discovered in random order, effectively solving the "travelling salesman problem‖, said scientists at Royal Holloway, University of London.

The conundrum involves finding the shortest route that allows a travelling salesman to call at all the locations he has to visit. Computers solve the problem by comparing the length of all possible routes and choosing the one that is shortest.

Dr Nigel Raine, from Royal Holloway's school of biological sciences, said: "Foraging bees solve travelling salesman problems every day. They visit flowers at multiple locations and, because bees use lots of energy to fly, they find a route which keeps flying to a minimum."

Using computer-controlled artificial flowers to test bee behaviour, he wanted to know whether the insects would follow a simple route defined by the order in which they found the flowers, or look for the shortest route. After exploring the location of the flowers, the bees quickly learned to fly the best route for saving time and energy.

The research, due to appear this week in the journal The American Naturalist, has implications for the human world. Modern living depends on networks such as traffic flows, internet information and business supply chains.

"Despite their tiny brains bees are capable of extraordinary feats of behaviour," said Raine. "We need to understand how they can solve the travelling salesman problem without a computer

Found in the Guardian Newspaper and via guardian.co.uk

I always knew the buggers had the edge on me.
Ed.

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Respect your Neighbours

There are some sound reasons to be aware of and be respectful to your apiary neighbours. The first is disease; we all have a responsibility to avoid the spread of diseases. It cuts both ways, you don't want theirs and they don't want yours. Make sure your bees are healthy. Know about the location of neighbouring apiaries and try to be aware of the health of their bees. Treat swarms with great care; isolate them for a time until you are sure they are fit and well. The second reason is forage availability; with a doubling in our membership in two years there is an increased possibility of overcrowding of hives in an area. Again this cuts both ways, overcrowding disadvantages all parties. The only realistic way to find out about neighbours is through contact in your division and with neighbouring divisions. Please use the network of contacts that exists in our association when you are setting up a new apiary and be particularly mindful of disease if you take swarms collected by another beekeeper