

MBKA Beginners' course

Session 2 Notes

Wax comb This is the basis of the nest, whether in a natural hole in a tree or in a hive.

- Bees consume 8 times more nectar to produce wax as they need to produce the same weight of honey
- They cluster together to generate heat and hang in curtains when producing wax
- Wax flakes emerge from between the segments on the underside of the abdomen
- They use their feet to remove the flakes and mould the wax to the required shape
- Porous wax cappings for brood
- Air-tight cappings for honey
- Wax is mixed with propolis to strengthen anchor points of comb on inside of nest cavity
- Hexagonal shape is probably formed as a circular cylinder of liquid wax, then surface tension of adjacent cylinders attract the walls and create the hexagonal shape
- Cells on opposite sides of comb are offset for strength
- Cells point upwards slightly to contain the nectar etc.
- Brood nest approx. spherical, then a ring of pollen, then nectar/honey stores around and especially above the brood nest. Size varies throughout the year so stores are often being shifted around to make space.

The bees' home

Make two lists of requirements from the bees' perspective and from the beekeeper's.

Bees' requirements

- Cavity of right size (approx. 40 litres)
- Space to expand into
- Weatherproof cavity
- Easily protected entrance
- Entrance allowing ventilation
- At height away from predators (3 – 5m)
- Away from other colonies

Beekeeper's requirements

- Moveable container, expandable size
- Convenient height to access and lift
- Access to combs for harvesting and colony manipulation
- Ability to harvest honey without disturbing brood
- Maintain bee space so combs/frames remain moveable
- Defendable / adjustable entrance
- Close to a few other colonies
- Work WITH the bees rather than destroy their hard work

History: Honey hunters became beekeepers when they started to keep bees in purpose designed and accessible “containers”, such as hollow logs.
Slide. For centuries in the UK bees were kept in straw skeps, sometimes protected in brick-built boles. Then colony manipulation was minimal, at the end of the season the strongest and weakest colonies were destroyed or driven out of the nest to collect the honey, while the medium ones were kept through winter to provide next year’s crop. Swarming was encouraged so as to increase stocks.
Moveable frame hives were developed in 1850’s and the most important development was Langstroth’s discovery of the **bee space**. 6-8mm – more is filled with wax, less with propolis. Allows two bees to work back to back on adjacent combs. All moveable frame hives are now designed and accurately constructed to respect this spacing. Moveable frame hives permit the harvesting of honey with minimal disruption to the colony and the management and manipulation of the colony to maximise crops and reduce disease or other stresses.

Hive parts **Slide.** Demonstrate a standard National hive with frames and two supers. Also 14x12, mesh floor, flat-pack.
Show bee space
“Warm” way or “Cold” way
Top space or bottom space
Frame spacings: Hoffman frames, plastic ends, castellations

Hive types: **3 slides** to compare WBC, Smith, National, Langstroth, Commercial, Dadant.Also Dartington – large, horizontal, intended to reduce beekeepers’ back problems but not really caught on despite being targetted at the urban market in fancy coloured plastic versions as well as basic timber.

Top bar hives: Traditional in Africa.
Bees build comb attached at their top edge to strips of wood.

Recently there’s been increased interest in top-bar hives in UK, particularly Warré and Stewart hives. Proponents claim they encourage a more natural form of beekeeping but there are distinct disadvantages and limitations so you should ensure you are fully aware of all the implications before going down this route. I would only advise their use by experienced beekeepers who have a very thorough understanding of the colony.

Dry assembly of flat-pack super

Coffee break

Forage

What are bees looking for?

Nectar – Energy food for all the bees. Carried in the crop, stored in the comb and converted to honey for long-term storage.

Pollen – Protein food for larvae and young bees. Carried in pollen baskets on hind legs and stored in comb close to the brood.

Water – For cooling and for dissolving crystalised honey. Carried in crop, not stored.

Propolis – Sticky exudate collected from plants and trees. Carried in pollen baskets. Foragers need help to unload this sticky cargo. Propolis has anti-bacterial and anti-viral properties so it is used in the nest as a “varnish” to sterilise cells and with wax to fill cracks and gaps.

Major forage plants.

Usually prefer native plants with fairly simple, open flower structure. Honey bees tongues are not as long as Bumble Bees’. There are many forage plants but some of local importance include:

Trees:

Sycamore	Horse Chestnut	Sweet Chestnut	
Cherry	Blackthorn	Lime	
Holly	Hawthorn	Crab Apple	Hazel (pollen)

Other plants:

Snowdrops	Aconites	Wood Anenomes	
Dandelion	Gorse	Wild Garlic	
Bramble	Himalayan Balsam	Rosebay Willowherb	Ivy

Setting up an apiary

- Liaise with neighbours
- Forage all year (pollen & nectar)
- Water nearby
- Early sun & ideally shade at mid day
- Shelter from wind
- No frost pocket
- Away from another beekeeper’s apiary
- Hives not in a regular pattern
- Safe flight path
- Stock proof (horses, cattle, badgers?)
- Level ground
- Plenty of room to work on the hive
- Easy access (vehicle)
- Storage for spare equip.
- Hidden from road or paths (& thieves)

Make up a super frame

Lunch

Why open the colony?

Slide You should always have a reason for opening a hive and know what you are looking for. You should be quite organised and systematic so as not to be distracted just marvelling at what wonderful insects they are and watching them meandering about the comb. It helps to keep detailed hive records at each visit. Read the notes of the last inspection before you open a hive and so know what to expect to find.

Minimise disturbance by:

- leaving the hive open for as short a time as possible,
- being careful and gentle in your movements,
- replacing combs in the same order and orientation unless you have a good reason for changing them,
- using minimal smoke.

Hooper's 5 questions:

Slide Each time you inspect a hive you should be looking for the answers to

- Is the **queen** present and laying as expected?
- Is there sufficient **space** for expansion and nectar storage?
- Is there any indication of **swarming**?
- Are there any signs of **disease**?
- Are there sufficient **stores** until the next inspection?

The beekeeping year

Autumn/Winter - Slide

- Check stores in September and feed as necessary. Aim for 40lbs honey ~ 8 full National brood frames
- Mouse guards
- Woodpecker protection
- Beware wind and frost pockets
- Bees cluster to keep warm. They use honey and shiver to generate heat
- Don't open the hive
- "Heft" the hive to weigh stores
- Watch the entrance for signs of first pollen being taken in

Spring - Slide

- First inspection
 - change or clean the floor
 - check queen is laying
- Colony rapidly builds in strength
- Soon into weekly inspections checking Hooper's 5 questions
- Swarm control

Summer - Slide

- Enjoy
- Anticipate the bees' requirements
- Encourage colony strength to build up without swarming by ensuring sufficient space for brood
- Add supers as necessary to provide space for nectar storage
- Harvest honey if ready
- Always leave enough honey/nectar stores for periods of poor weather!
- Be vigilant for disease
- Help bees to defend stores against robbers, eg: wasps or other honey bees

Supers - Slide

- Designed to be stacked one on another
- Provide space to store nectar and honey
- Shallower than brood box
- Frames can be spaced more widely than in brood box to store more honey
- Above a queen excluder means no brood so honey can be harvested
- Also provide space for bees to prevent congestion in the brood box
- Add supers before the bees need them

What is Honey and how do the bees make it?

- ~ 78% natural sugars: mostly fructose and glucose which are readily absorbed by the body
- < 18% water
- inhibits microbial action
- many health benefits from trace elements including pollen, phytochemicals (from plants) and enzymes added by bees

Bees collect nectar, carry back in crop, pass from one to another several times, enzymes in their saliva break down the complex sugars into simple sugars. Then spread out in the comb and fan to evaporate moisture until water content is below 18% then cover with a non-porous wax capping to preserve.

Harvesting

- Any time between May (Oil Seed Rape) and Sept. (Heather)
- When more than 50% of cells are capped and the honey doesn't shake out
- Leave enough for the bees
- Clear bees from the super with Porter bee escapes (or shaking or blowing)
- Remove boxes of frames
- Extract honey (use a knife to remove wax cappings then spin the honey out or cut up the comb, squeeze or melt)
- Replace "wet" frames on to hives for the bees to clean/dry. They will take the remaining droplets of honey down leaving dry comb which will store better over winter.

Feeding - Slide. Handouts of slide plus WBKA booklet, "Feeding bees".
Show examples of Miller, rapid, contact feeder, frame feeder.

What	How	When	Why
Thin syrup	Approx. 1kg white sugar in 1.25 litres water	Spring or Summer	To simulate a nectar flow and increase egg laying rate
Thick syrup	Approx. 1kg white sugar in 0.65 litres water	Autumn	To supplement honey stores for winter
Candy or fondant	2.5kg white sugar boiled in 0.5 litres water	Winter or early Spring	If colony is running short of stored honey
Pollen patties	?	Spring	If there's insufficient pollen forage available