BBKA Honey Bee Health Assessment Theory part 2

Role of Good Hygiene

Prevent the introduction and spread of disease and pests to colonies and apiaries by:

Beekeeper

- Clean hive tools and gloves between colonies with washing soda solution
- Collect any wax and debris removed from the colony and store in bee-proof container
- Return extracted honey frames to the original colony
- Keep bellows of smoker clean
- Regular disease inspections
- Clean beesuit

Apiary set up

- Have hive entrances pointing in different directions to avoid drifting.
- Spacing between hives for manipulations without interfering with adjacent colony flight paths
- Manage entrance sizes to minimise robbing
- Store used equipment and old frames hygienically
- Keep apiary tidy and grass cut
- Keep equipment in good repair

Honey bees

- Replace comb regularly to remove potential build up of disease
  - Ideally complete brood comb change every 3 years
- Minimise the movement of frames of brood between colonies
  - Exceptions; making increase, queen rearing, uniting
- Ensure hive equipment well maintained and cleaned between uses

Procedures to avoid or reduce transmission of disease

Restrict

Restrict movement of equipment and bees in and out of the apiary

- Quarantine apiary
- Equipment used within an apiary is dedicated to that apiary
- If more than one apiary, separate clothing and protective wear for each apiary

Clean

Always clean equipment between hive inspections

- Cleaning fluid 1kg soda crystals to 5 litres water
- Scrubbing tool to remove debris
- Wash or replace gloves between inspections
- Remember to clean boots

Place

Place equipment appropriately

- Supers etc. behind the hive and off the ground
- Frames with bees on to the front of hive with route back to entrance
- Cover supers to prevent robbing

Take care

Take care during inspections

- Not to spill bees out of hive
- Not to kill/squash bees unnecessarily
- Not to cause bees to become lost and drift

Healthy Brood Frame

Colony Starvation

Spray Poisoning

Signs

- Lack of flying bees around the apiary in a normally busy period
- Large numbers of dead bees outside the hive
- Fewer foraging bees at the entrance
- Poisoned bees denied entry to the hive
- Bees trembling, falling over and spinning on their sides
- Dead bees with their proboscis extended
- Colony may become aggressive and throw out infected bees

Actions

- Inform your local NBU Inspector
- Record as much detail as possible
  - including why you think pesticides are involved
  - Note the weather conditions,
  - location
  - take photos
- Inform the Spray Liason Officer
- Let the farmer know if you can
- Take three samples of 200 bees, store in freezer
  - One sent to NBU
  - One for own use/analysis
  - One spare
- Feed the survivors with 1:1 syrup

Action if warned before spraying

- Close hive up night before
- Cover hive with awning to keep cool
- Give bees a water source inside the hive, e.g. sponge over crown board hole

What happens next

- Bee Inspector visits site
  - May take another sample of bees
  - If Bee Inspector satisfied as a poisoning incident, it is booked in by NBU
- Wildlife Incident Investigation Scheme
  - WIIS will appoint an advisor to liaise with the BI
  - Will investigate incident
  - Upto 12 weeks to identify poison
  - Natural England will follow case through

BeeConnected

Connecting beekeepers and farmers

Contact

If you have any queries about Bee Connected please contact us via email.

info@voluntaryinitiative.org.uk or call Neal on 07736 638139

Share with

The Voluntary Initiative
Promoting responsible pesticide use

Brought to you by the Voluntary Initiative. Bee Connected aims to help the communication between beekeepers and farmers.

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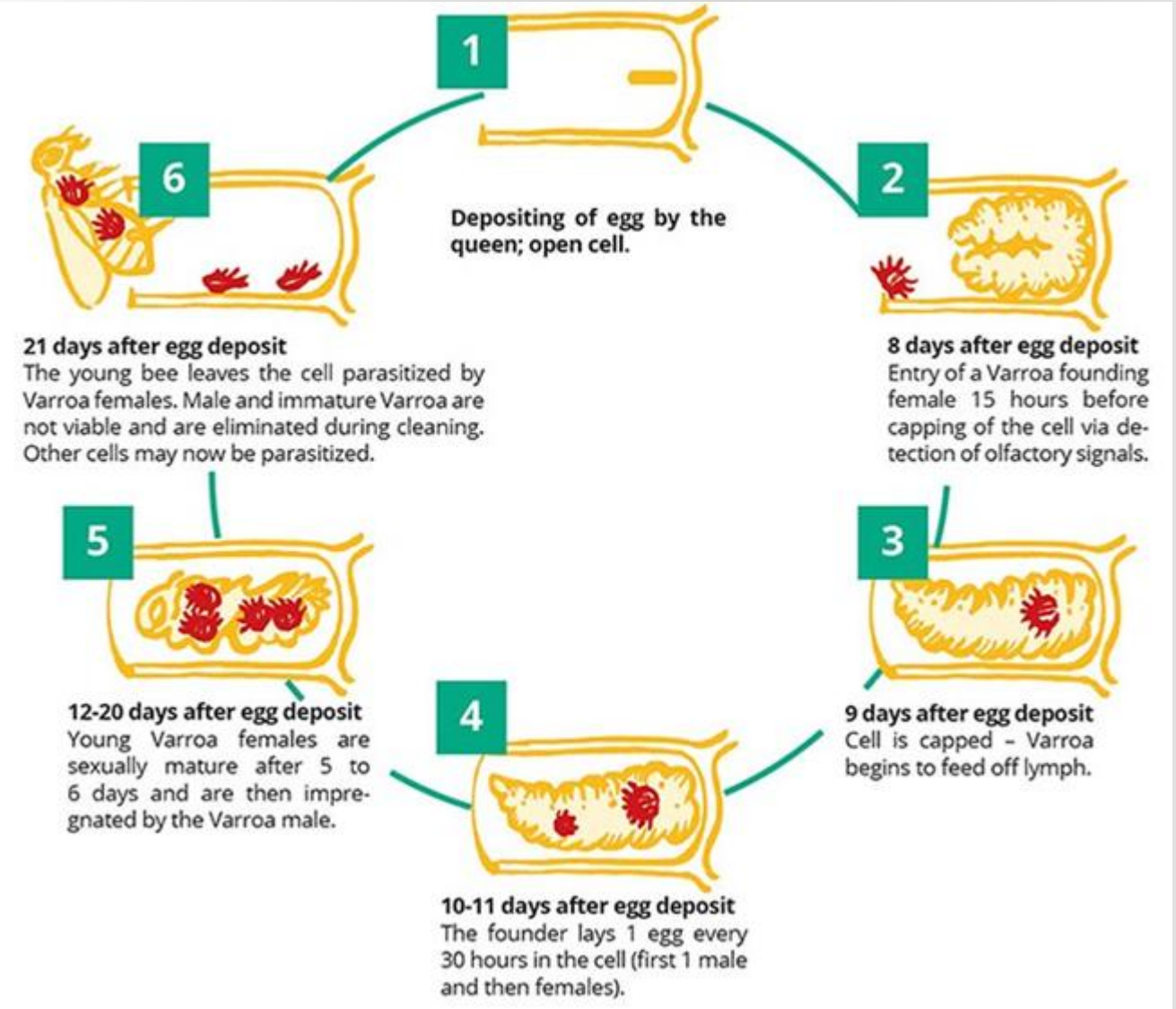
Effects of pests on bees and comb

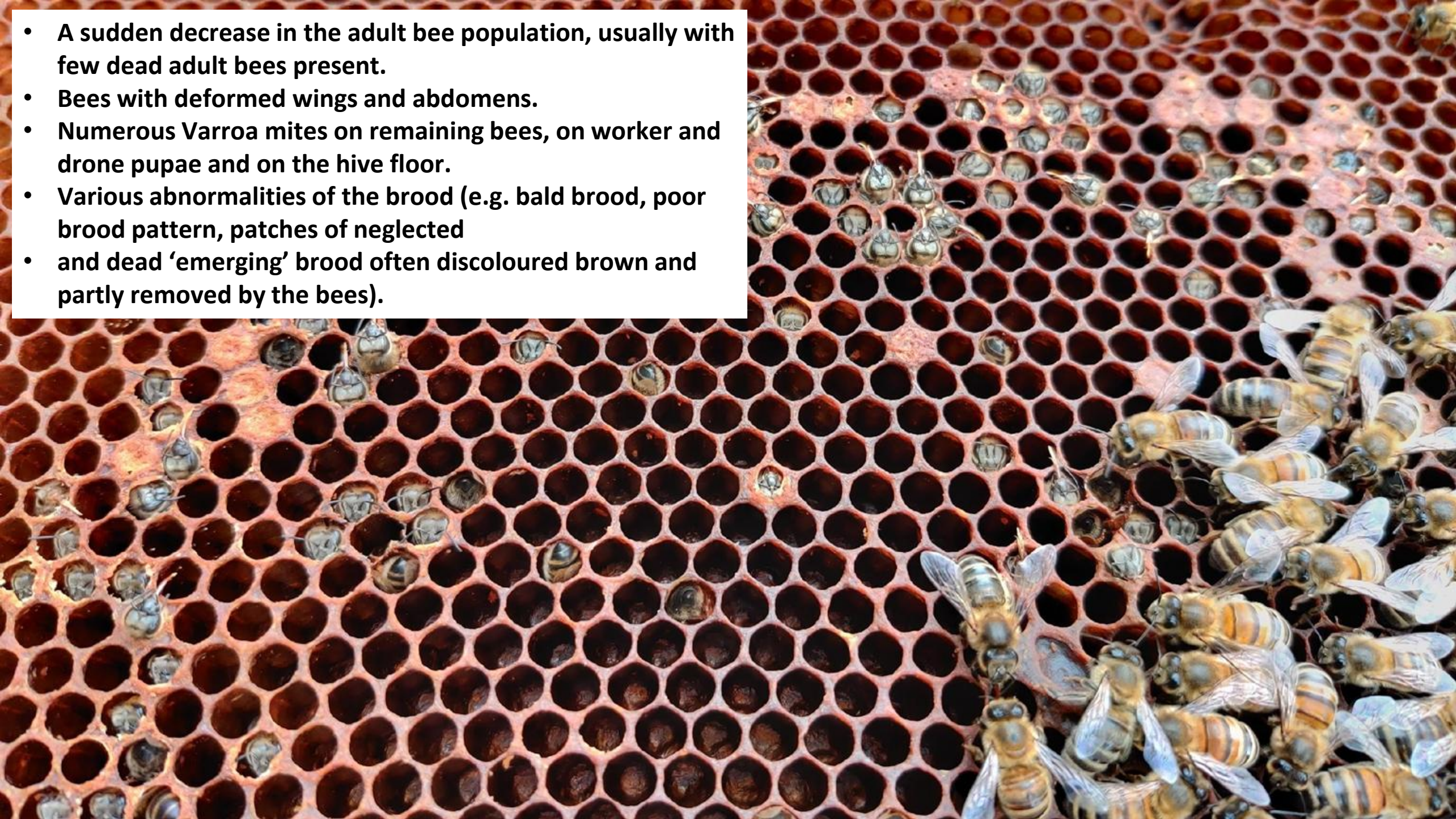
Varroa

Symptoms

- Pepperpot brood pattern
- Perforated cappings
- Bees with deformed wings
- Phoretic mites on bees
- Dead larvae in cells



- **A sudden decrease in the adult bee population, usually with few dead adult bees present.**
- **Bees with deformed wings and abdomens.**
- **Numerous Varroa mites on remaining bees, on worker and drone pupae and on the hive floor.**
- **Various abnormalities of the brood (e.g. bald brood, poor brood pattern, patches of neglected**
- **and dead ‘emerging’ brood often discoloured brown and partly removed by the bees).**



Monitoring varroa

Varroa board

- Insert varroa board under mesh floor and leave for up to 7 days
- Scrape debris into jar with some methylated spirit or equivalent
- Varroa will rise to the surface and can be easily counted
- Divide number of varroa by number of days board inserted for daily drop rate
- Check against BeeBase calculator

Sugar shake

- https://www.youtube.com/watch?v=UqniPeZvbaE
- https://www.youtube.com/watch?v=2IqH5Cc9wfg
- Put 200/300 bees in a jar with an open mesh
- Put tablespoon of icing sugar in jar
- Roll jar to cover bees
- Shake out icing sugar over a board/tray, shake robustly for 1 minute
- Count varroa, if >5% treat colony

Drone uncapping

- Using an uncapping fork collect 100 drones from sealed cells
- May take several sweeps
- Count number of drones with varroa
- If >5% treat colony

Time of the year	INFESTATION LEVEL	
	Alcohol wash Powdered sugar CO2 gasing *Average sample: 300 worker bees*	**Natural mite falls on sticky board** *Number of mites per day*
Early spring	≥ 1%	0,5 mites
Between two honey flows	> 2 %	5 mites
End of season: July – August (before treatment)	> 3 %	10 mites
Winter (after treatment)	≥ 2 %	1 mite

Treatment required!

Veto-pharma pamphlet

Varroa Treatments

Application	Example chemical	Consideration
Trickle	Oxalic acid	Open brood only
Vapourisation	Oxalic acid	Open brood only
Evapouration	Formic acid	Strong colony, causes stress, no honey supers
Contact	Thymol	No honey supers

- **Api-Bioxal** – oxalic acid - Chemicals Laif, SpA. Approved in September 2015. Powder for in-hive use. Can be applied by trickling or by vapourisation. For trickling, the powder is dissolved in a sugar syrup and then 5 ml of solution trickled on bees between the frames. The treatment should be made in a single administration. For vapourisation, the powder is heated for three minutes and the resulting gas allowed to permeate the sealed hive for a further ten minutes.

- **Apiguard Gel** – thymol - Vita Bee Health. Approved in July 2003. The opened tray is placed face upwards on top of the brood frames, surrounded by an eke. If after 10 days it is almost empty, it is replaced with a second tray. If there is product left in the tray after 10 days, it is left until day 14 and then replaced. The second tray is left in position for a further 2–4 weeks to complete the treatment. Apiguard works best at temperatures above 15 °C. It is also effective at lower temperatures even though the gel takes longer to evaporate and needs to be left in place for longer.

- **Apilife Var** – camphor racemic, eucalyptus oil, levomenthol, thymol - Chemicals Laif. Approved in June 2009. A tablet is broken into 3–4 bits and placed on the top bars. It is left for 7–8 days. Treatment is repeated 3–4 times according to the level of infestation. Any remaining tablet is removed after the last treatment. Use in summer (July–September) or any time the temperature is above 20 °C. Do not use when there is honey on the hive.

- **Apistan** – tau-fluvalinate - Vita Bee Health. Approved in November 1998. Two strips are inserted into the brood box for a period of six weeks (two brood cycles). The strips should be inserted, spaced apart, hanging on different frames fairly centrally in the brood nest where bees will walk over them. Apistan should not be used during a honey flow.

- **Apitraz** – amitraz - Laboratorios Calier, SA. Approved in April 2016. Two strips per hive are hung between two frames of stores, near but not in the brood area. Strips should be removed after 6 weeks to avoid any overdose issues. Treat when there is little brood in the hive but the bees are still active. A second treatment, if required, should be given before the bees start storing honey in the spring.

- **Apivar** – amitraz - Véto Pharma. Approved in September 2017. Honey is removed from the hive. Two Apivar strips are hung in the centre of the brood nest with at least two frames between them. Strips can be left in the hive for 6–10 weeks. There is no risk of overdosage. Do not use when there are honey supers on the hive. For emergency treatment, remove supers first. There is no withdrawal period for Apivar.

- **Bayvarol** – flumethrin - Bayer plc. Approved in July 1992. Four strips are inserted into the brood box for a period of six weeks (two brood cycles). The strips should be spaced apart, hanging on different frames fairly centrally in the brood nest where bees will walk over them. Bayvarol should not be used during a honey flow.

- **Mite Away Quick Strips (MAQS)** – formic acid - NOD Europe Ltd. Approved in February 2013. Two MAQS strips are placed on the top bars of the (lower) brood chamber approximately 5 cm apart and the ends 10 cm from the edges of the hive. Stagger them so that they lie flat and across the full width of the hive. Do not remove the paper wraps. Ensure the colony has a full width entrance. Maximum outside daytime temperature should be 10.0–29.5 °C on the day of application. Do not disturb the colony during the seven-day treatment period. Strips do not have to be removed.

- **Oxuvar** – oxalic acid - Andermatt BioVet GmbH. Approved in October 2016. Sucrose is dissolved in lukewarm oxalic acid solution according to the instructions. Using a syringe, 5–6 ml of the solution per full frame is trickled directly onto the bees between two frames. Use freshly made solution. Wear gloves and safety goggles during application. Carry out one treatment only in broodless colonies when the outside temperature is above 3 °C. Do not store ready-made solution.

- **Oxybee** – oxalic acid dihydrate - DANY Bienenwohl GmbH. Approved in April 2018. Oxybee is available as a powder and solution to prepare a beehive dispersion (a liquid for use inside the beehive) and can be obtained without a prescription. Oxybee is trickled onto bees in the hive and should be used only when the temperature outside the hives is at least 3 °C. The dispersion should be warmed to 30–35 °C before application.

- **PolyVar Yellow** – flumethrin - Bayer plc. Approved in March 2017. PolyVar Yellow consists of plastic strips impregnated with flumethrin which are fixed at the entrance forcing bees to pass through on their way in and out of the hive, coming in contact with the active ingredient. Two strips per hive. Treat for at least nine weeks but no longer than four months. Do not use if you know your bees are resistant to pyrethroids.

- **Thymovar** – thymol - Andermatt BioVet GmbH. Approved in June 2010. Treatment should take place 3–4 weeks after all honey supers have been removed. The hive is placed on a solid floor. For a single brood-chamber hive, one strip is cut in half and placed on top of the brood frames. Two strips are used on top of the upper box for a double brood-chamber hive. The treatment is repeated after 3–4 weeks. Daytime temperatures should be 20–25 °C. Do not use Thymovar if the maximum daytime temperature exceeds 30 °C.

- **VarroMed** – formic acid, oxalic acid dihydrate - BeeVital GmbH. Approved in April 2017. Available in a ready-to-use solution in a bottle with an integrated nozzle and practical scale for easy dosing. It can be used in spring, late summer/autumn and winter, both when there is brood or no brood in the hive. Different doses are given for different colony sizes. Shake the bottle and then apply the solution onto the bees between the frames. Count the dead varroa mites after six days and repeat if necessary.

Article July 2018 Edition of Bee Craft Magazine

Treatment cycle

Varroa infestation naturally follows the growth cycle of a colony

- As the colony expands the varroa population increases
- Varroa management relies on having a low count at the start of the year
- Going into winter colonies need to be strong and healthy i.e. low varroa count

Choice of treatment and timing needs to take into consideration

- Honey harvest
- Whether treatment applicable to the state of the colony
- Whether treatment can be carried out with honey supers on

Mix of chemical and non-chemical treatments

- Integrated Pest Management v Treatments

Integrated Pest Management

For Varroa Control

BBKA NEWS

Special Issue Series

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Comb Trapping

Table 1. Timecourse of colony manipulation and expected colony development

Day	Beekeeper's operations	Detail on development in the colony
Day 0	Place the queen on comb 'A' and confine within the comb cage. Place the cage with the comb and queen in the centre of the brood nest.	Colony in normal state with varroa present both in brood and on adult bees.
Day 9	Remove frame 'A' from the cage and leave it in the brood nest. Place the queen on new comb 'B' and confine within the comb cage. Place the cage with comb 'B' and queen in the centre of the brood nest. Do a full hive inspection to check for queen cells – destroy any that are found.	Comb 'A' has eggs and unsealed brood just before sealing. This will attract mites who will enter the unsealed brood cells and gradually get sealed in. The rest of the combs in the colony will have mostly sealed brood. Any unsealed brood will be drone brood. There may be supersedure queen cells constructed as the queen has been confined.
Day 18	Remove frame 'A' from the colony and destroy. Remove frame 'B' from the cage and leave it in the brood nest. Place the queen on new comb 'C' and confine within the comb cage. Place the cage with comb 'C' and queen in the centre of the brood nest.	All the brood on comb 'A' will be sealed and so will the mites within it. Comb 'B' will have eggs and unsealed brood ready to be sealed. There will be no unsealed brood anywhere else in the colony. The only option for any phoretic mites looking to reproduce is the unsealed brood on comb 'B'. There may be supersedure queen cells on comb 'A'.
Day 27	Remove frame 'B' from the colony and destroy. Remove frame 'C' from the cage and leave it in the brood nest. Release the queen into the colony.	All the brood on comb 'B' will be sealed and so will the mites within it. Comb 'C' will now have eggs and unsealed brood. There will be no brood anywhere else in the colony. The only option for any phoretic mites looking to reproduce will be the unsealed brood on comb 'C'. The queen can now move freely on all combs.
Day 36	Remove comb 'C' and destroy.	All the brood on comb 'C' will be sealed and so will the mites within it. Most of the mites within the colony will have been removed with comb 'A' and 'B' and those that are in the colony will be trapped on comb 'C'. There will be eggs and unsealed brood on other combs, but no sealed brood harbouring mites.

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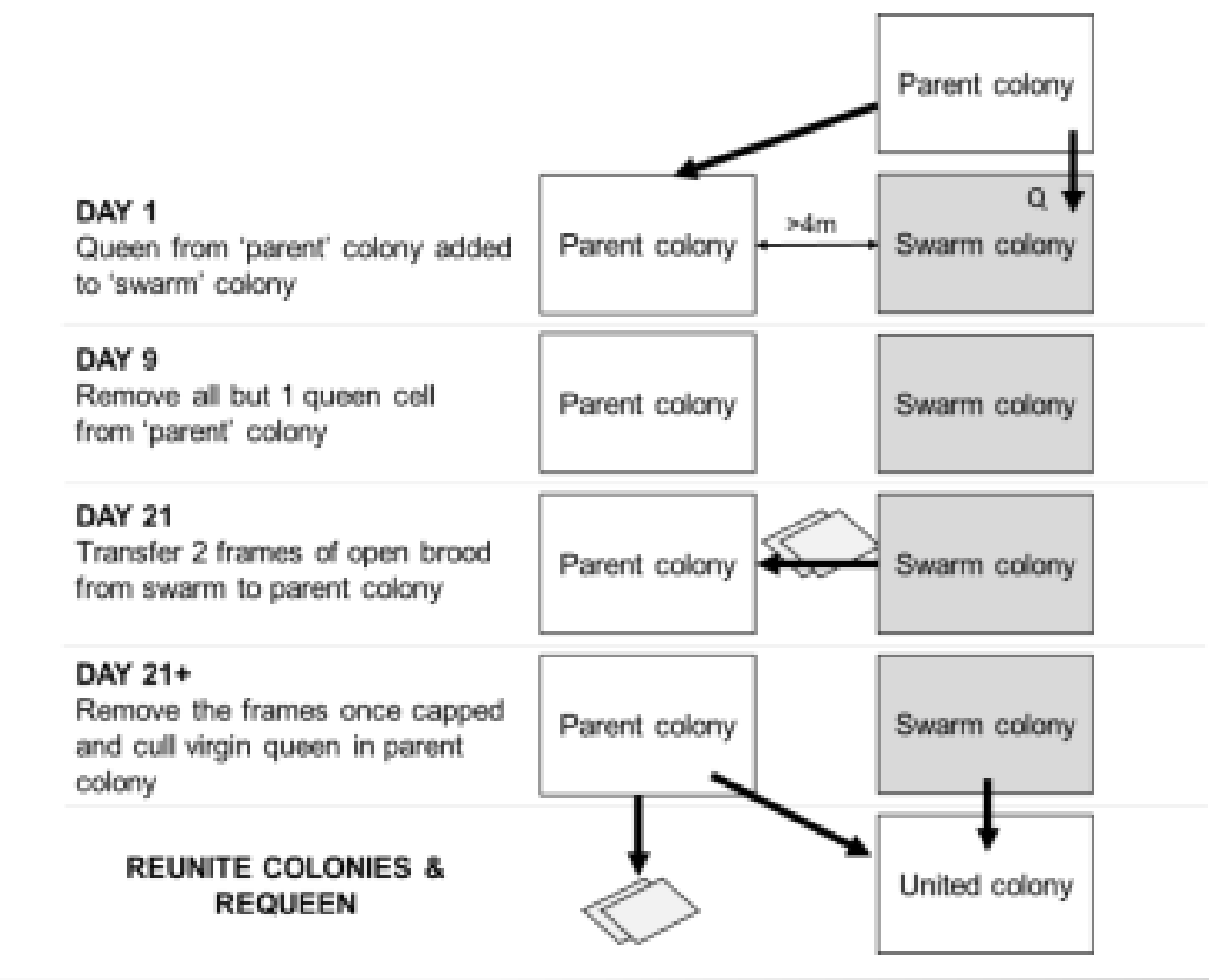
Artificial Swarm for varroa management



NBU Managing varroa

Method	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Open mesh floor	■	■	■	■	■	■	■	■	■	■	■	■
Drone brood removal				■	■	■	■					
Queen trapping				■	■	■	■					
Shook swarm				■	■	■						
Artificial swarm				■	■	■	■	■				
Oxalic acid	■			■	■	■	■	■			■	■
Apiguard/ Apilife-Var				■				■	■	■		
MAQS					■	■	■	■	■	■		
Apistan/Bayvarol								■	■	■		

Mite resistance

Avoiding Resistance

To delay the development and spread of resistance beekeepers should:

- treat with the specified dose
- treat for the period specified
- treat as little as necessary
- alternate treatments (where possible) with one or more unrelated treatments

Testing for pyrethroid resistance

Method: USDA Beltsville Test

1. Cut a 9mm x 25mm piece from an Apistan strip and staple to centre of a 75mm x 125mm index card. Place card in 500ml jar with strip facing inwards.
2. Prepare a 2–3mm light metal mesh cover for jar.
3. Shake bees from 1–2 combs of a colony into an upturned roof. Scoop 1/4 cup of these (about 150) and place in jar.
4. Place a sugar cube in jar. Cover with mesh lid and store upturned in dark, at room temperature.
5. After 24 hours hit upturned jar with your palm over white paper three times. Count dislodged mites.
6. Place upturned jar in a freezer, until bees are dead (1–4 hours). Count the remaining mites.
7. Calculate percentage mite kill. Less than 50% indicates you may have resistant mites.

Caution: This method gives only a crude indication of resistance and further confirmatory tests are advisable. Discard results if the total number of mites per jar is below five.

Method: NBU Resistance Test

The NBU field resistance test is a modification of the Beltsville test using a purpose made test cage and low dose Apistan 'Package Bee Strips' (see Figures 48 and 49). The methods used is similar. However, a larger sample of bees is taken (approx 200), the test takes a shorter period (4 hours) and the bees are killed by immersion in soapy water, after which dead mites and bees are separated with a stream of water in coarse and fine sieves.

Method: Checking post treatment *Varroa* mite mortality

1. Maintain colony on a mesh *Varroa* floor with collection tray beneath.
2. Treat as usual with pyrethroid strips for 6 weeks.
3. Clean tray and check daily mite drop immediately after treatment finishes.
4. Significant mite drop indicates a mite population remains and therefore your treatment may not have been effective – requiring further investigation.

How to Manage Wax Moth

Keep strong colonies

Do not leave wax or old equipment lying around

Store in cool place

Have a strategy for cleansing comb and hardware

Store Supers wet or dry

Store brood frames in insect tight environment and treat with Acetic acid

Methods of protecting comb

- Freezing – 0 to -17˚C for minimum a few hours
- Heating - >49˚C for a few hours (wax becomes malleable at < 49˚C)
- Certan, Bacillus thuringiensis
- Acetic acid

Stage	Freezing	Heating	Certan	Acetic acid
Egg	✓	✓		✓
Larva	✓	✓	✓	
Chrysalis	✓	✓		
Adult	✓	✓		✓

Potential threats


Any Questions?