

Module 3 – Support group

Section 1
Part B and C Answer Guidance

Part B- 5 questions

Question (please give the number of marks per part of the question to total 15 or 30)	Answer
<p>1. How does <i>Melissococcus plutonius</i> affect an individual larva? (10)</p> <p>Describe the appearance of the larva (3)</p> <p>And give a timescale. (2)</p>	<ul style="list-style-type: none">• Bacteria fed in brood food,• Very young larvae• multiplies in ventriculus• Starves larva• Bacteria remains in gut and do not invade the tissue• Visible white gut when examined.• Some are removed by house bees• and others survive to pupate.• Survivors defaecate at pupation and contaminate the cells• Rubbery scale that can be removed•• Twisted misshapen• Discolouration of larva, yellow through to shades of green, brown.• Loses segmentation• Larva 2 – 3 day old are infected, after that their immune system protects them.• Dies day 5 before cell is sealed

<p>2. Give a description of the way European foulbrood affects a colony (6)</p>	<ul style="list-style-type: none"> • Reduced brood. • Surviving, infected brood of poor quality as larval development was poor. • Reducing nurse bees. • Affected bees become foragers earlier. • Bees die earlier. • Colony dwindles.
<p>Describe the visual signs on the comb (5)</p>	<ul style="list-style-type: none"> • Spotty brood pattern as bees removes dead infected larvae • Perforated cells with dead, rotting larva inside. • Dark coloured rubbery removable scales at gravity bottom of the cell. • Possible foul sour smell caused by secondary infection – Alvei. • Larvae twisted and upright in cells • Discoloured larvae • Non segmented larvae
<p>When might EFB be more noticeable and why (4)</p>	<ul style="list-style-type: none"> • More noticeable when there is a high nectar flow. • Nurse bees recruited into foraging earlier so fewer bees to both feed larva, remove the infected larvae and clean cells.. • Eggs being laid in cells that have been previously infected. • In weak colonies and colonies under stress, fewer bees to feed the larva.

3. Describe how AFB and EFB may be spread between colonies

i) By the beekeeper and beekeeping equipment (6)

- Moving brood frames from infected colonies,
- feeding infected honey,
- Contaminated secondhand equipment and frames,
- cross contamination from visiting other apiaries
- migratory beekeeping to or from an infected area,
- not doing disease adequate checks
- lack of education to the signs of disease
- Poor apiary hygiene.
- Not washing Beesuit, smoker etc adequately.

ii) By bees (3)

- Robbing,
- drifting,
- unknown swarms

How would all equipment and Personal Protective Equipment be treated following an outbreak of EFB (6)

- Scorch all the boxes, roofs, floors etc plastic rails burnt, which are in store.
- Polystyrene hives soaked in a 5% bleach solution.
- Burn frames and wax.
- Washing soda smoker, bellows, disposable gloves
- Washing soda and scrub hive tools and anything that's been in the apiary
- Wash bee suit -washing soda.
- Shook swarm the whole apiary and scorch all the equipment.
- If all frames not burnt, then render wax from frames in 'healthy colonies and boil those frames.

4. How often is it advisable to carry out a disease inspection for foulbrood? (1)

Describe how to do an inspection for brood diseases. (4)

Describe an integrated pest management system to minimize the risk of brood diseases. (8)

- 2 times a year - in spring and autumn.

- PPE smoke etc,
- shake all the bees off and inspect.
- Examine every frame with brood
- Open any abnormally sealed cells and look inside.
- Use matchstick and burn in smoker. (or tweezers and wash afterwards)
- Uncap Drone brood to establish Varroa population.

- Keep unused clean equipment separate from and unused dirty equipment.
- Disinfect unused boxes floors etc by scorching
- Have a policy of only bringing clean equipment into the apiary
- Store used bee equipment and honey supers in a bee proof area
- Regular comb replacement on a 3-year cycle
- Disinfecting used comb by freezing or ethanoic acid treatment
- Return supers to the hive they came from
- Control robbing
- Avoid drifting by irregular hive placement.
- Maintain apiary hygiene.
- Hive collected swarms in a quarantine area/apiary.
- Don't obtain bees from an area infected with Brood disease – check bee base.
- Don't used second hand frames or wax – burn them.
- Scorch/sterilise secondhand equipment before use.

<p>Why is AFB more difficult to eradicate than EFB? (2)</p>	<p>It forms long lasting spores which are resistant to heat, chemicals and freezing EFB bacteria is less robust.</p>
<p>5. Explain how American foul brood develops in a larva. Include timescales in the answer. (7)</p> <p>Describe what you would see on the comb. (4)</p> <p>How does AFB affect the colony as a whole? (4)</p>	<ul style="list-style-type: none"> • Spores fed to larvae in brood food • Young larvae, less than 48 hours old are infected • Germinate in gut to produce vegetative cells • Vegetative cells invade the epithelium and enter the haemolymph when the larva pupates • Proliferates in the tissues and sporulates. • septicemia results. • The larva dies at prepupal stage • The dead larva rots down and forms scales on lower surface of cell – this scale is contaminated with AFB spores. House bees get these spores on their mouth parts when trying to clean the cells. They are then fed to new larva. <ul style="list-style-type: none"> • Sunken greasy capping, • perforated cappings • Brown slimy pupae • Pepper pot brood pattern - empty cells where the queen can't lay because of the scales • Scales on lower surface of the cells which cannot be removed. <ul style="list-style-type: none"> • Brood nest reduces. • Available space to lay eggs reduces. • Worker number reduces. • Colony dwindles. • Colony cannot defend itself. • Colony dies.

Part C – Question 1

American foul brood is suspected during an inspection.
What signs would lead to this conclusion? (6).

- Sunken greasy capping
- Scales on the bottom surface of the cells.
- Scale cannot be removed.
- Perforated cappings
- Brown discoloured pupa Slimy larvae
- Spotty Brood pattern

Describe the matchstick test. (1)

- Matchstick inserted, withdraw slowly. Contents of cell rope to 10-30mm

What steps should be taken as soon as AFB is suspected? (4)

- Take photos as evidence to send to the Bee inspector.
- Reassemble the hive
- Reduce the entrance to one bee space to allow flying bees to return and to discourage robbing /drifting.
- Contact NBU or local bee inspector – follow their instructions
- Wash bee suit/footwear and any equipment that has been taken into the apiary with washing soda and hot water.
- Place apiary site under voluntary Standstill – nothing moved in and nothing moved out.

Describe how the bee inspector will deal with the suspected outbreak. (9)

- Bee inspector will examine brood and
- Do lateral flow (LFD) test as a field diagnostic.
- If Positive or still suspect the LFD together with any frame or larval samples to NBU
- If result is confirmed by the NBU the colony will be destroyed
- 1 Metre square pit in the ground.
- In the evening, after bees have stopped flying, kill bees with petrol.

<p>Explain how the bee inspector would use the lateral flow test (6)</p>	<ul style="list-style-type: none"> • Burn all brood and super frames • Honey is also destroyed. • Hive body and parts sterilised by scorching or soaking in Bleach. • Formal standstill order applied to the apiary. Nothing out of apiary. • After a minimum of 6 weeks, the Bee inspector checks all ok and releases standby if appropriate
<p>What is the correct way to examine a brood frame for the scales of AFB (1)</p>	<ul style="list-style-type: none"> • One suspect larva • Put in bottle with buffer solution • Shake for 20 seconds to macerate • 2 drops into circular window. • Wait 3 minutes • 1 Blue 'C' line -negative Control • 2 blue lines 'C' + 'T' - control plus test is positive
<p>Why is it very important to register colonies with Beebase? (2)</p>	<ul style="list-style-type: none"> • Stand and hold the comb so the light comes over your shoulder and falls on the comb so that the lower surface of the cell is clearly visible. • Use a torch if necessary
<p>What are the statutory rights of a bee inspector (1)</p>	<ul style="list-style-type: none"> • Bee inspector knows of your apiary location in case of a disease outbreak • Receive details of any disease outbreaks in the immediate area. • Can see where disease is Can see how many colonies are in a 10 km radius • Can inspect any colony if suspected of disease even if the colonies aren't registered or owner a member of a bee keeping association.

	<ul style="list-style-type: none"> • Can destroy colonies and burn equipment where disease has been confirmed.
<p>Part C – Question 2</p> <p>European foul brood is suspected during an inspection in early spring during the first nectar flow. What visual signs might lead to this conclusion? (9)</p> <p>Why are signs of EFB more visible at this time of year? (4)</p> <p>What steps should be taken as soon as EFB is suspected? (6)</p>	<ul style="list-style-type: none"> • Twisted misshapen larva • Lack of segmentation in larva. • Discoloured larvae - yellow green brown. • Larva remains will not rope with the matchstick test. • Spotty brood pattern • Empty uncapped cells where larvae have been removed • Rubbery scales at gravity bottom of cells which is easily removed • Visible white gut when larva examined and 'squashed' • May be a sour smell – secondary infection of Alvei. <ul style="list-style-type: none"> • Brood nest is building quickly. • Nectar flow not sufficient to feed both the larva and the developing EFB bacteria in their gut. • The bacteria wins the competition for food and the larva is starving. • Colony numbers are still growing so fewer bees to police and remove infected larvae. • Infected cells from previously well-fed larvae that have managed to pupate and void their guts full of bacteria into cell, cleaned up by house bees that go on to feed larvae as nurse bees. <ul style="list-style-type: none"> • Take a photo to send to the be inspector. • Reassemble the hive. • Close entrance to one bee space to allow foragers to return and prevent robbing • Contact NBU or regional be inspector

<p>Describe how the bee inspector would deal with a mild outbreak. (7)</p>	<ul style="list-style-type: none"> • Disinfect PPE and anything that has been in the apiary such as smoker hive tool etc wash in washing soda • Place apiary site under voluntary standstill. • Bee inspector will inspect, diagnose with LFT, sendoff samples to the NBU. • If confirmed the site is placed under formal standstill • If Late April onwards and the colony is strong enough a shook swarm would be carried out. • Honey can be extracted under licence. • All brood frames and super frames are destroyed in a fire. • Antibiotics Terramycin now only used in exceptional circumstances, usually commercial beekeeper where destruction of the hives would be economically catastrophic. • After a minimum of six weeks - Reinspected and standstill released if no sign of EFB.
<p>How would treatment differ if the case was severe? (2)</p>	<ul style="list-style-type: none"> • If severe kill bees with petrol • destroy frames and wax by burning in 1m pit. • Honey can still be extracted under licence.
<p>How would it differ if mild EFB was found in Autumn? (2)</p>	<ul style="list-style-type: none"> • In autumn shook swarm not appropriate, colony doesn't have time to recover. • Antibiotics may be used in exceptional circumstances otherwise the colony would be destroyed.