Southern African Honey Council (SAHC) Newsletter

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Contents

From the editors desk[1]

The Section 7 Committee Investigation of the South African Beekeeping Industry was issued in February 2008. The purpose of this report is to provide an overview of the South African beekeeping industry with a view to making recommendations to the National Agricultural Marketing Council (NAMC) and the Minister of Agriculture. It was the intention of the Section 7 Committee for the document to serve as a platform for further discussion within the industry and between the industry and government. Recommendations came in the following broad categories;

1. The unification, consolidation and structuring of industry
2. Legislation/ regulation
3. Food Safety
4. Research
5. Training/ information and dissemination
6. Small farmer development/ unexploited forage usage
7. Imports

While there is still considerable discussion as to the recommendations of the Section 7 report and their implementation the following extract from a SABIO discussion document summarizes the various scenarios and options;

"A. A beekeeper could ignore SABIO and continue to produce his honey for his clients, just as we have always done. If there is a disease out there and wipes his colonies out. Tough. Maybe he unwittingly spreads the disease to us and the wild population. Now that is where the government will become involved because it is going to affect crop production, and this beekeeper will feel aggrieved when all his bees are destroyed.
Because there is an Beekeepers Act which required him to be registered and inform the Govt Inspector of any problem, he will become the centre of a lot of attention.

B. So the beekeeper registers with SABIO but absolutely refuses to contribute to SABIO. However he is willing to share in all the research gained, the marketing of honey, and information on keeping diseases away from his bees. Well soon there won't be any funds to promote SABIO with consequent demise of a vibrant bee industry, because why should I pay when he does not.

C. The beekeeper registers with SABIO, pays a joining subs, agrees to abide by good practices, contributes to SABIO say a few cents for every bottle he sells, and receives information and help from SABIO that furthers his business to be making a better profit.
The bee industry status will be recognised as an essential part of agriculture and be liaised with by other interested parties. It will be the consumer who pays for SABIO but also receives a better product.
The crunch is going to be how much is each producer going to contribute , and how is it going to be fairly controlled. ??

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Suppose SABIO should have a budget, and if we knew how much honey is sold, then a simple sum would tell us how much per bottle.
It is up to us to decide if we want a Beekeepers Organisation, and what its function/ constitution should be."[2]

It is a well established fact that strong and pro-active producers associations are very effective partners in promoting and lobbying members' interests with, government, markets as well as in coordinating the different sectoral interests within an industry. It is therefore of the greatest importance that other countries follow South Africa's example and promote activities to strengthen national beekeeping organizations and, further, promoting strong interactions between national organizations so as to address regional issues.

Figure 1; Frame with a good comb of sealed brood; see drone cells at bottom corners.

[2] SA BEE INDUSTRY, Implementation of NAMC Recommendations, http://www.sabio.org.za

BEEKEEPING

Beekeeping

M.D. Schmolke

Introduction

Beekeeping is a complicated subject that has many different parts to it; that's why beekeepers never stop talking! When trying to write about one aspect many side issues intrude! Hence the title: just "Beekeeping", and now I can go off in any direction!

Controlling bees

People have been working with bees for many, many years and they learned – up to a point – how to subdue the bees so that they could collect the honey, if doing nothing else, without getting too badly stung. One reads about many different techniques such as spraying the bees with water or dilute sugar syrup, banging on the sides of the hives, anaesthetizing the bees, and most commonly, the use of smoke to calm the bees. Smoke has been used for a long, long time – apparently Aristotle, the famous Greek, used smoke from burning lumps of dry cow-dung. Today, most beekeepers use bee smokers with bellows to blow the smoke from a variety of fuels in a fire box onto the bees. We use dry cow manure from grazing cattle which are not being fed on meal concentrates which may contain high protein elements which can give off bad smelling fumes which could irritate the bees. Other fuels mentioned are rolled up corrugated cardboard, pine needles, decayed timber, sacking, grass, leaves, etc. I'll stick with cow manure! There are, of course, thousands of beekeepers in Africa and elsewhere, who do not have Bee Smokers and they may use bundles of grass with some green leaves added to make smoke. This method may cause veld fires!

The reaction of bees to smoke

It will be noticed, when a hive is opened, that many bees will have their heads in the open honey cells – they will be drinking the honey and engorging themselves. This is a reaction to the smoke. Smoke is a danger signal to the bees as, over thousands of years, smoke heralded fire (and still heralds fire) which may have forced the bees from their nests. Those that engorged themselves could carry enough food to enable them to flee and set up home elsewhere. When starting work at the hive, give the bees time – a few minutes – to react to the smoke and to engorge themselves; this is most important. Engorged bees are less likely to sting although they can do so.

Bees are very sensitive to smells or odours. Smoke is used to mask the smell of the person who is working with the bees. However, it is not advisable to go to the bees smelling strongly of sweat, perfume, garlic, etc. Be particularly careful not to get the strong smell of khaki weed (*Tagetes minuta*) or *Lantana camara* on your clothes as bees react badly to such smells.

Reasons for opening a hive

Curiosity! You just want to know how your bees are getting on. If you are a beginner, or little experienced, then it is a very good idea to open a hive and see what the bees are up to – you need the experience, and you can see what progress has been made since your last visit. But, remember that you

will be disturbing the goings on in the hive even if you manage to keep the bees quiet and well behaved. Inspect only once a fortnight.

Many small scale or hobby beekeepers keep their hives near their homes where they can monitor the activities of the bees. A lot can be learned from just watching the activities at the hive entrances.

On warm summer mornings the foragers may be seen quite early (sometimes soon after dawn) flying out in large numbers to go collecting nectar and pollen. Depending on what is flowering, the activity may slow down by mid-morning and begin again in the late afternoon.

If many bees are bringing in pollen it is an indication that the colony has much brood, i.e., many larvae to feed. Many bees collecting water from a bird bath, or other source, can also indicate that much brood rearing is going on. Water collecting may also indicate that the bees are trying to cool down the inside of the hive – see that it is not in full sun all day long in summer.

Drones flying around in large numbers at mid-day indicate that the bees are doing well. The colony may be getting strong enough in numbers to swarm so steps may have to be taken to stop swarming.

Much activity at the hive entrance will indicate a strong colony with a good queen laying many eggs each day – 1500 or more. Compare the activity between different hives. Less activity may mean a smaller colony but it may still have a good active queen and will build up in numbers. A weak colony may need to have brood, bees, or both added to it, or it may need other attention from the beekeeper.

An indication that the bees need more room in the hive is if there are many bees clustering in a black mass at the hive entrance. Where there is such activity the colony will need urgent attention! It will at least need some room for honey storage and will probably also need space for the queen to go on laying eggs.

Inspecting a bee hive

How to approach a Hive

a) Light your Smoker. Make sure the fuel in your smoker is burning properly. We light a piece of newspaper and then push it down into the smoker – squeezing the bellows to keep it burning. Smallish pieces – 20-30mm lumps of dry cow manure – are gradually added while the bellows are worked. When clouds of white smoke are produced the smoker is closed and, if left standing vertically, it usually continues smoking by itself.

b) Put on your protective clothing (bee kit) and make sure everything is secure. Do not try and work without protective clothing until you really know your bees well and are sure that you won't upset them and get stung.

c) Collect up hive tool, etc. Have a hive tool or other suitable tool with which to open the hive easily. Take with you any items that you may need, e.g., spare top-bars, frames, etc. You will need experience to anticipate what you will need.

d) Smoke hive entrance. As soon as you reach the hive, blow smoke into the hive entrance. Do not pump the smoker bellows too vigorously or the smoke will get too hot and confuse the bees, but do blow the smoke into the hive entrance properly from a distance of 20 or 30cms. Stand to one side of the hive out of the flight path of the bees. (A companion to apply the smoke will be very useful so that you can use both hands to handle hive covers, etc.) Smoke gently for a good few minutes allowing time for the bees to engorge themselves.

e) Remove the outer cover without banging the hive and put it to one side.

Opening a Top-bar Hive

a) Introduce smoke as you use the hive tool to lever up and remove the last top-bar and to separate the next ones. The rear bars will often have no combs on them except during a honey-flow when there is a strong colony in the hive, so remove one or two more bars. Move the next empty bars to the rear until you reach a comb that you want to inspect. Lift the top-bar, keeping the comb hanging straight down. The comb should not be attached much to the sloping sides of the hive but, if there are some attachments, cut them free with the hive tool or with a long knife.

b) If a comb is straight, and you do not want to remove it, return it to the rear of the hive. This will leave open a gap only the width of 2 or 3 bars wide and the bees will not object as much to this as if the whole hive was open. Blow smoke into the gap periodically to keep the bees from flying out. Lift the next top-bars out, one by one, and inspect them.

c) Combs that are full of completely capped honey may be removed and can be placed in a suitable container for transport. A short, lightweight hive of the same shape as your top-bar hive will be useful. The bees can gently be brushed from the comb with a bee-brush or a bundle of grass (don't use smelly weeds!).

d) Inspection of brood combs will indicate how well or how badly the queen is laying. If you are not satisfied with her performance then make a note to re-queen the colony, e.g., by removing the queen and then uniting a whole swarm together with its queen.

e) Keep open only a small space. Keep the opening into the top-bar hive to the width of 2 or 3 top-bars by adding new bars, with wax guide-lines, to replace those that are removed.

f) Smoke should be puffed into the hive periodically. It is not necessary to use too much smoke if the bees are well-behaved – i.e., if they are not trying, in large numbers, to sting you.

g) After the inspections make sure that all the top-bars are pushed together to maintain the correct spacing of the combs and to reduce the spaces between them which the bees will fill with propolis.

h) Replace the water-proof cover of the hive.

Opening a Frame Hive

a) Use the hive tool to gently prize up one corner of the inner cover and blow in some smoke. The bees will have glued the inner cover down with propolis. Loosen the inner cover all round and take it off the hive. Bump off any bees back into the hive, a few puffs of smoke with stop the bees from flying up.

b) Use manipulating cloths. It is advantageous to use two cloths to cover the hive. Each cloth should be big enough to cover the hive and strips of wood to hold the ends down are useful. Roll back the first cloth to expose the first two frames at the edge of the super or brood chamber.

c) Remove the second frame first. It is easier to remove the second frame than the first, so push the first frame as close to the side of the hive as possible. Loosen the second one which can then be lifted out for inspection. By glancing into the hive you will be able to see if the first frame has had a comb built up on the foundation wax, and what is in it.

d) Put one frame aside. It can be removed from the hive to give more room so that the next frames can be lifted out without squashing any bees. The frame removed can be placed on end leaning on the hive.

e) Roll back the first manipulating cloth to expose only one or two more frames, and use the second cloth to cover the frames which have already been examined. Continue rolling the cloths back and forth so that the space of only two or three frames is exposed at any one time. This will make it easier to control the bees with a little smoke.

f) Re-arrange super frames. Bees usually completely fill with honey the central combs in a super while still building up the outer combs. To get the combs all filled more evenly before adding another super to the hive, the full combs can be placed in the outer positions and the incomplete ones put in the centre.

g) Most beekeepers wait for all combs in a super to be fully capped before cropping them all. There is, however, no reason why a few fully capped combs cannot be cropped and be replaced with empty combs. Combs removed should be covered after removal.

h) All the frames in a super may be inspected together as it is quite easy to loosen a super and then to tilt it up on end and look in at the bottom to see what progress has been made; if it's getting full of honey, add another one before leaving the hive.

i) To get into the brood chamber it will, of course, be necessary to remove any supers first. These supers can be stacked on the edges of the inverted roof (so as not to crush any bees) and covered with the inner cover.

j) The manipulating cloths can be used to cover the top of the brood chamber and its frames can now be removed and inspected as was done for any supers.

k) With a well established colony, the outer frames in a brood chamber will usually contain pollen and honey and the other frames will have brood, i.e., eggs, larvae, and pupae. If all the frames are quite full and there is no room, i.e., no empty cells, for the queen to lay in then space must be created for her. This can be done by removing any combs completely full of honey or pollen and replacing them with frames containing empty combs or foundation wax. Some combs with stored pollen should, of course, be left in the hive but sometimes the bees store an excessive amount of pollen and reduce the space for brood rearing so some of it can be removed.

l) Remove drone comb. If all the frames in the brood chamber were fitted with wax foundation then there should not be too much drone brood. If there is too much, it may be removed by taking out the whole frame, or the areas of drone brood may be cut away and removed.

m) Add a super for brood rearing. In good beekeeping areas, colonies can grow large and, with good queens, there may not be enough space in one ten-frame Langstroth brood chamber for maximum brood rearing. In such cases, a super may be placed on the brood chamber under the queen excluder to give the queen more combs to lay in. A very strong colony can result – be sure you can handle such colonies!

n) Cape Bees. In South Africa, where the Cape Bees (*Apis mellifera capensis*) can be a problem, I believe it is the practice to limit the size of bee-hives. We have not been affected by Cape Bees here in Zimbabwe so I cannot give any advice on how to cope with them. Advice should be sought from the appropriate authorities in South Africa.

More room for the bees

a) Top-bar Hives

If a top-bar hive gets full and crowded then it is necessary to remove some combs – any combs full of capped honey can be cropped from the rear and one or more of the older combs can be removed from the front of the hive, where they will probably be full of pollen. Honey combs

with many drone cells should be removed – this is also useful in controlling varroa mites as they prefer breeding in drone cells.
All brood combs should be moved next to each other in the front half of the hive. One or two new bars can be placed within the brood area so that the bees can build new combs for the queen to lay in, and another new bar can be fitted in behind the brood before the honey combs. With new combs to lay in, the queen is less likely to move on to the honey combs in the rear half of the hive.

The removal of some old honey/pollen combs, and drone combs, will give space for the bees to build new combs in the brood area. This will reduce the inclination of the bees to swarm. If the top-bar hive still has many combs with sealed brood, and there are already many bees in the hive, the hive may again get over-crowded quite soon and swarming may then result. To reduce the chances of over-crowding, some brood combs with sealed brood may be removed (such combs can be given to weaker colonies to strengthen them).

(In certain parts of Harare we routinely remove 3 or 4 combs packed full of pollen from our Kenya Top-bar Hives late in July. These combs are found just behind the first comb which is usually full of old honey. This comb and the pollen combs are removed and then the brood combs are all moved forward. This means that the older brood combs are brought to the front from where they will be removed the next year. New brood combs will be built and they will be attractive to the queen.

b) Frame Hives
With frame hives which are crowded with many bees it may be necessary to add one or two more supers for the bees to work in. The addition of supers for honey storage will obviously give the bees more room to live in and room for them to store honey.
This may, however, not deter them from swarming, i.e., splitting into two or more colonies, and more will need to be done.

If all the combs in the brood chamber are full of brood and there are no empty cells for the queen to lay in, then this congestion must be relieved. Another brood chamber may be added below the queen excluder but it is more usual to add a super below the queen excluder – very big colonies can result! More comb space in the brood chamber can also be provided for the queen to lay in by the removal of frames with combs full of honey and/or pollen and replacing them with frames containing wax foundation. Any frames with large areas of drone cells may, or rather should, also be removed from the brood chamber.

Bee populations – overcrowded hives

If masses of bees are crowded at the entrance of a hive at any time then it is likely to be overcrowded and will probably swarm soon! It should have been attended to before it became overcrowded.
Inspect all the brood combs and ensure that there is enough good comb space with worker cells for the queen to lay in. If necessary, replace one or two combs with new frames or top-bars.
If there are newly laid eggs (i.e., eggs fixed straight up in the bottoms of the cells) then the old queen is still present and the bees won't have swarmed. Any queen cells must be found and can be removed.

If there are no eggs to be seen, then the bees will probably have swarmed (i.e., old queen will have gone) and queen cells will be found. If one is open with a neat round hole at the tip, then a queen has

emerged and there will be a new virgin queen somewhere in the hive (don't bother trying to find her!). Find and remove any other closed queen cells.

Bee populations - equalizing

If a hive is getting overcrowded (or if it is getting too strong for you to handle comfortably) the colony may be reduced in size by diverting its field bees into a weak colony. This is done by switching the positions of the strong colony and a weak one. The many field bees of the strong colony will return to their well-known station and be accepted into the weak hive because they come with pollen or nectar. The weak colony will, of course, be strengthened nicely and the strong colony, having lost many workers, will more than likely destroy any queen cells and stop preparations for swarming in the near future. Both colonies should be inspected after about a week. The presence of a queen in each hive must be confirmed and, if either is missing, the loss must be remedied.

Inspecting a 'young' colony of bees

When inspecting a young colony, still in only one brood chamber, it is easy to see how many frames are being worked on – just remove the inner cover and look down between the frames to see where the bees are clustered. Some frames with combs can be lifted out and inspected.

For a top-bar hive, the bars can be tapped with the hive tool – bars which resonate differently will have combs on them and some of these can be lifted and inspected.
Combs on the edges of the cluster should have honey in them - if not, the colony may need feeing with sugar syrup.

The combs within the cluster should have concentric circles of brood of different ages if the queen is laying well. If the brood does not look good, then the queen should be found and judged – she may be old (tatty, broken wings), too small, etc., and may need replacing.
If the brood is patchy (i.e., open, empty cells amongst the larvae and pupae) a close look should be taken at the larvae. Healthy larvae will have a shiny, yellow appearance; unhealthy larvae will be darker, even brown in colour, and will be lying in unnatural positions, i.e., stretched out along the length of their cells instead of being curled up on the bottom of the cells.

European foul brood

Sick or dead larvae may be infected with European Foul-brood (EFB) which is also called European Brood Disease. This is a bacterial disease which affects larvae only. It can be spread from hive to hive by the beekeeper, by bees from an infected colony entering a healthy colony, or by bees sharing a water source. It is a stress disease and will be more evident when a colony is short of pollen, or is hampered by prolonged bad weather, etc.

EFB is seldom a problem in Zimbabwe and we hardly ever see any evidence of it. When we do see evidence of it, we kill the queen in the hive and replace her with the hope that the new queen's workers will have the right house-keeping (hygienic) behavior patterns in them. They should remove the sick larvae before the larvae die, disintegrate, and "allow" their loads of bacteria to "escape" and be spread onto other larvae. The "new" bees should have replaced the old "unhygienic" bees within 6 weeks or so and signs of the disease should disappear.

American Foul-Brood

EFB must not be confused with AFB which is a much more serious bee disease. AFB has not, to my knowledge, ever been found in Zimbabwe although AFB is now known to occur in South Africa. Larvae with AFB die later and their cells are capped by the bees. The cappings later become sunken or hollow. The vegetative stages of bacteria of both diseases can be killed with antibiotics but AFB bacteria form resistant, long lasting resistant spores which are best destroyed by burning[3]. Both EFB and AFB are serious bee diseases where European races of honeybees are kept but neither disease seems to affect our African races (e.g., *Apis mellifera scutellata*) very seriously. Nevertheless, beekeepers, particularly those in South Africa, who suspect AFB in their hives must consult the relevant authorities for advice and must abide by instructions and must incinerate both bees and hive parts if told to do so.

Conclusion

Many books and articles have been written about bees, beekeeping, and hive management. Some writers go overboard and give so much detail that their writings become incomprehensible; others don't explain clearly what they mean. I know how difficult it is to strike a balance, and I don't know what you think of my efforts! If you are dissatisfied you may contact the Editor!

Beginners and less experienced beekeepers may accept what I have written but they will, in the end, work out systems of hive management which suit them. Experienced beekeepers may or may not find anything useful and may even strongly dispute what I've written. Busy large-scale beekeepers are unlikely to fiddle too much with their bees like those who have only a few hives to look after but they do whatever is necessary to get honey!

It will be apparent to many beekeepers that I have only just briefly referred to some of many different aspects of our very involved business. There are many publications which can be referred to for clarification but, if anyone wishes me to expound my views based on my own experience, my readings, and on my discussions with other beekeepers, the Editor can be asked to solicit further contributions from me (or from anyone else!).

Colonies of honeybees each have a spirit or morale; call it what you will. Help them to live comfortably as they want to and you will get them to store more honey than they need and you will be able to crop the surplus. Crop your bee-hives; don't rob all the honey!

[3] Please note the comments on the use of antibiotics in the subsequent article - Ed

Honey bee diseases, Part 1

Dr H. Human and Dr C.W.W Pirk[4]

Honeybees have a natural resistance to some diseases and mites and should not be dependent on our treatments for their survival, for example honey bees collect propolis (plant resin) using it to prevent fungal growth. The use of antibiotics and pesticides can result in the contamination of honey, beeswax and other hive products. Furthermore, these antibiotics and treatments have to be authorized by the responsible authorities. In addition diseases and mites may develop resistance to these products with extended use, rendering treatments ineffective. These treatments can also negatively affect humans and therefore the use drugs or antibiotics are not encouraged: drugs are not a substitute for good bee keeping.

The aim of this series is to inform and educate the reader about the numerous different honey bee diseases. Two very important aspects of good beekeeping are the inspection for and the correct diagnosis of diseases, in order for the correct treatment to be applied. So one key feature of good beekeeping management is the ability to recognize and distinguish between these various bee diseases, whether serious or less important. This is essential since early detection of a disease allows for prompt action and thus the prevention of serious disease outbreaks and subsequently economic losses.

There are basically two categories of bee diseases: diseases affecting the brood and those affecting adult bees. The brood combs of healthy colonies usually have a compact pattern; almost all the cells from the center of the comb outwards contain eggs, larvae or pupa. Cappings are convex and tend to have a uniform color. In contrast diseased colonies have brood combs with a spotted brood pattern (pepperbox appearance) and cappings tend to be darker, sunken and punctured. Dried out larval remains or scales can be found on the bottom or sides of cells. Adult bee diseases do not present unique symptoms and symptoms such as an inability to fly, shivering and trembling, unhooked wings and even dysentery can be associated with many other diseases/ disorders.

The most important diseases for the South African beekeeping industry are the following:

Bacterial diseases	**Fungal diseases**	**Viral diseases**	**Parasitic Mites**
American foulbrood (AFB) European foulbrood (EFB)	Stonebrood Chalkbrood Nosema	Deformed wing virus (DWV) Kashmir, Acute bee paralysis virus and Israeli acute paralysis virus (ABPV, IAPV) Sacbrood	Varroa Tracheal

Part 1: Bacterial diseases

American foulbrood (AFB)

This bacterial infection is caused by the spore-forming bacterium *Paenibacillus larvae*. It affects only the brood and causes large scale colony losses, is highly contagious and extremely difficult to eradicate. The bacterial spores are very resistant to heat extremes and chemicals, remaining viable for many decades in honey, old combs, hives and equipment.

After the consumption of bacterial spores by honeybee larvae, the spores germinate and multiply rapidly in the gut of the larvae. Infected larvae die and their remains dry out to highly infectious foulbrood

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scales, each containing billions of spores (it takes as few as 10 spores to trigger the disease). ***This infection is deadly for honeybee larvae but is of no direct threat to mammals***

Clinical Symptoms

- Infected colonies have ***scattered and uneven brood patterns*** with dark, greasy looking, sunken cappings (pepper pot appearance).
- Some cappings may be perforated as a result of attempts by adult honeybees to remove the dead brood while in other cells' cappings may have been totally removed, leaving the infected remains exposed.
- Larvae of affected brood are at first light brown turning darker brown with time.
- ***Ropiness*** can be demonstrated in cells where dead larvae have not yet formed scales: poke a stick into this mass, macerate and withdraw it from the cell. If AFB is present the contents will rope out (i.e. extend) up to 10-30mm. Larval remains drawn out beyond 20 mm is the most definitive field test known for AFB. However, not all types of AFB do this.
- The ***tacky stage*** is observed when infected brood has dried to a dark scale which adheres tightly to the wall of the cell. These scales are difficult to remove and remain a site for constant re-infection.
- A distinct foul odor is usually present in the hive, resembling yeast when making beer.

Diagnosis

Ropiness is the most definitive field test known for AFB, together with the distinct foul odor. AFB can be identified with a diagnostic kit and microscopic analyses. A range of laboratory techniques are available for confirmation. However for routine work microscopy is sufficient.

Treatment / control

- Hygienic management practices are essential
- Regular hive inspections
- Antibiotics for treatment only, not as a preventative measure. Antibiotics only suppress symptoms but do not eradicate AFB Antibiotic resistant AFB has been reported[5]
- The most successful method of treatment for confirmed AFB is to kill infected colonies and to burn equipment or alternatively use the shaking method
- Disinfecting used hive material is very difficult. Radiation is often used in Australia. In Europe previously cleaned hives and frames are dipped in NAOH (caustic soda) with brown soap.

Status in South Africa

Announced by OIE 2009

[5] . However it should be noted that antibiotics are not registered for use in any sub-Saharan country. Also the use of antibiotics will lead to longer term problems of AFB resistant to the antibiotic, bees susceptible to AFB and potential residues in the honey

Figure 1. AFB infected broodcomb

Figure 2. Ropiness

European foulbrood (EFB)

EFB is a brood disease caused by the non spore forming bacterium *Melissococcus pluton*. The bacteria do not form spores but instead a capsule that is less resistant than AFB spores. EFB affects open brood and is common during spring when brood rearing is at its height and may severely weaken a colony. It is aggravated by conditions such as food shortages, moisture and cool temperatures. A good honey flow seems to hasten recovery. EFB damage is variable and although the disease is considered less serious than AFB, high losses resulting from EFB have been recorded. It is one of the major disease problems in Switzerland for example. Transfer of EFB is similar to that of AFB. The bacteria are transferred through trophallaxis, the exchange of food between workers or workers (nurse bees) and larvae, bees cleaning cells, beekeepers and the interchange of contaminated equipment.

Clinical Symptoms

- A scattered pattern of sealed and unsealed brood may be an indication of a serious level of infection
- EFB kills younger larvae than AFB. In general infected larvae die when 4-5 days old / also called the **coiled stage**.
- Sick larvae appear **twisted** in cells
- The **colour** of the larvae **change** from shiny white to pale yellow and then brown.
- Larvae normally die before their cells are capped.
- Ropiness only up to 10mm
- The EFB scales do not adhere to cell walls and can easily be removed. Scales have a rubbery rather than brittle texture.
- A sour, sometimes stinky odour can be detected.

Diagnosis
Field identification with a diagnostic kit from VITA. Microscopic examination is reliable to distinguish between EFB and AFB

Treatment / Control
Control methods are determined by strength of infection;
Weak infection - may be sufficient to stimulate hygienic behavior of bees.

- place colonies at a good foraging site / feed them sugar water/ honey or spray individual combs with thinned sugar solution.

Stronger infection- requires the removal of most of the infected brood combs.
- replacing the queen increases resistance to diseases and interrupts the brood cycle that allows for the removal of dead/ infected larvae from the hive.

In serious cases - the same methods as for AFB is recommended
- Hygienic management practices are essential

Status in South Africa
Omnipresent

Figure 3. EFB infected larvae, coiled stage

Figure 4. Larvae normally dies before capping