

WCBA

WESTERN CAPE BEE INDUSTRY ASSOCIATION



WKBV

WES-KAAPSE BYEBEDRYFS VERENIGING



Capensis

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A message from our Chairman



Fellow beekeepers

It is always a pleasure to have the platform to communicate with you all as well as our extended stakeholders within the industry. Let me also take this opportunity and extend my appreciation on your devoted support for the association and the management committee. This is your association and it is there to serve you. And I believe in this new year, extra efforts will be made to best serve you.

As always, a new year presents an opportunity to take stock of the previous one and also to bring in new ideas and channel the great energy filled with positivity to achieve newly set targets and goals. But this cannot be done unless the hiccups and challenges of the previous year are fully unpacked, understood and plans to address them are executed.

The committee understands this very well and are currently embarking on a process to present a detailed plan on how these will be addressed. Yourselves as devoted members will be part of the process as we seek to reignite and inclusive participation for our greater good. More details on the plan will be brought to your attention as we build up towards our annual general meeting, proposed for the 30th March 2019.

One sad reality that has not stayed behind in 2018 are the fires! As much as it is the nature of our prestigious fynbos ecology and cycle, the very little forage left for our bees is taken away each day. Putting more pressure on us as to how we continue to keep our bees healthy and productive. We will, through the provisions set out by the BIS, and subsequently the ongoing process to set up the Bee Forage Working Group, hope for speedy processes that can assist in better addressing the forage challenge.

Yes, it's not going to be an overnight solution but we will get there – together. In the meantime I would urge you to assist one another, learn and offer advice among ourselves on the different cost-effective feeding options in order to keep afloat. The glimpse of such assistance and interaction were already visible at our recent field day held at Theewater Sports Club on the 16th February 2019. It can only get better...

I will leave other matters that require more detail for the AGM, as they will be presented through the Chairman's Report. These include, among others: membership status; registration and compliance; legislative updates; BIS progress; bee-related research; proposed conferences and symposiums; pesticides issues and reporting; pollination matters and a few other aspects/prospects.

I thank you and many others for your continuous support and wish you all the best for the year ahead.

Tlou Masehela
Chairman



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The WCBA is affiliated to SABIO, the South African Bee Industry Organisation. See www.sabio.org.za

CONTENTS

Field day feedback	2	Bees sleep, and may dream	7
The brilliant beauty of beeswax	3	Important honeybee forage plants	8
Bee space: Mind that gap	5	Registration forms	10
Ongeregistreerde bybenutters	6		

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Field day feedback

The WCBA Field Day, held at Villiersdorp on 16 February 2019 and attended by 67 bee enthusiasts, was a great success. Mike Allsopp of the Agricultural Research Council gave a presentation on the state of the industry, with all its challenges.

Mike Allsopp began his address with comments on the current status of the beekeeping industry in the Western Cape, noting that one of the biggest obstacles in the industry is a lack of unity.

For 25 years there has been constant bickering and disunity between beekeepers, despite the Herculean efforts of many people, he said.

Beekeepers need to urgently clean up their act and start working together to make any meaningful progress.

He noted that out of the estimated 1 000 to 1 500 tons of honey produced in South Africa annually (there are no precise figures), only 500 – 700 tons are produced in the Western Cape.

More than 4 000 tons of honey are imported every year, whereas 25 years ago there were no imports at all.

The declining volumes of honey produced in the Western Cape is largely due to a lack of safe sites with enough forage. There are too many beekeepers and not enough suitable sites.

The loss of gums

The leading cause of forage shortages is the loss of gum trees, through alien clearing – particularly by the Working for Water programme – and changing forestry requirements which have led to reduced planting of new plantations.

Another cause of the loss of gums is due to pests. There are at least six insect and two fungal pests that affecting gums. Luckily, sugar gum, gomphoccephala (tuart) and iron bark don't seem to be significantly affected by these pests. However, beekeepers should expect pest levels to increase in gums.

Other factors affecting forage are that in citrus orchards the pesticide problems are only getting worse, and in canola, there are new pests and subsequently new pesticides.

Theft and vandalism remains an enormous problem, and accounts for up to 30% of the annual operating costs of beekeepers. These costs are so high they are making beekeeping non-sustainable.

Additionally, fires, drought and climate change are having terrible affect on the industry. Beekeepers in the Betty's Bay, Bot Rivier and Tulbach areas have been badly affected by fires this



Having a field day: Johan van As, who organised the event, and Mike Allsopp, who delivered a presentation about the state of the beekeeping industry.

summer. Given climate change, beekeepers should expect more fires.

Another problem is the public perception is that most honey available commercially is 'adulterated honey', which makes sales harder. Proper labelling is essential to combat this perception.

It's not all bad, he said. There are many grounds for optimism in the industry. Firstly, the demand for pollination services is increasing by 25% or more a year. Cultivation of blueberries, macadamias, almonds and deciduous fruit in particular are increasing at a brisk rate.

Demand is expected to double

Demand for pollination is expected to double in the Western Cape by 2025, and beekeepers are already struggling to meet the demand.

Prices for pollination should increase as the shortage of pollination units develops, which would be a good thing as prices paid locally for pollination are less than half the global norm.

Another positive aspect is the overall health and resilience of bees in the Western Cape. Diseases and pests such as AFB, varroa, viruses and wasps do not seem to having a big impact on our bees.

The challenges facing the industry in the

Western Cape are much the same as those elsewhere in the world. While suitable forage and the capacity to keep bees is decreasing, the demand for bees is increasing.

There are various possible solutions to the lack of forage. Obviously, moving bees to sites with better forage is one, where such sites can be found.

The need to feed

More realistically, feeding bees would help. However, locally this is problematic. Unlike temperate-climate bees, which store excess feed as honey to be able to survive the winter, African bees tend to turn excess food into brood and then swarm.

Creating suitable feed is an issue. There are many commercial products out there, from imported pollen to artificial diets to any number of sugar mixtures. Some of these feeds are of dubious quality, and as far as Mike is aware, there has been no local analysis or testing of any of them.

Ideally, there should be research and proper data around feeds, but given the lack of resources available to the beekeeping industry, this is unlikely.

• Summary courtesy of James White-Phillips.



The brilliant beauty of beeswax

Wax takes a lot of effort for bees to produce, but is very versatile and has many uses.

Beeswax has been used since prehistory as humankind's first plastic, as a lubricant and waterproofing agent, in the casting of metals and glass, as a polish for wood and leather and for making candles, as an ingredient in cosmetics and as a component in some paints.

It has been found in Egyptian tombs, in wrecked Viking ships, and in Roman ruins. Beeswax never goes bad and can be heated and reused. It's edible, too – beeswax is a common ingredient in natural chewing gum. So, what is beeswax (*cera alba*) and how is it made?

What is beeswax?

Beeswax is a complex substance bees secrete to manufacture and repair combs and protect pupae. These waxy combs are a series of interlocking hexagonal shaped tubes composed of fatty acids, hydrocarbons, and proteins. For readers with an understanding of chemistry, its main constituents are palmitate, palmitoleate, and oleate esters of long-chain aliphatic alcohols.

Beeswax also contains propolis, which shields beeswax from going bad. Made by the bees by combining plant resins with wax flakes and pollen, propolis is used to used fix and strengthen the beehive while protecting the hive with an antiseptic barrier – propolis comes from the Greek meaning "defence of the city."

How bees make beeswax

The process of how bees make wax is complex and depends on many factors, and only young worker bees have wax glands. When bees are around 12 days old, glands on the underside of their bellies begin to produce wax flakes. They use this wax to build new cells and to cap the ones storing ripened honey.

Wax glands are most productive in 12-18 day-old workers. After producing wax for a few days, the wax glands begin to degenerate and by the time the bee is ready to leave the hive to become a field bee, usually when it is about 21 days of age, the glands have completely degenerated. The queen does not have wax glands.

Factors necessary for wax production

Wax production can only begin when there is an adequate supply of honey in the colony. Worker bees must consume pollen during the first 5 to 6 days of their life because it contains the protein needed for the development of fat cells. Pollen is mixed with honey to create "bee bread" that worker bees feed the developing larvae.

Nectar gathering and honey conversion

The next step in how bees make wax involves older worker bees leaving the hive to forage and collect nectar from flowers. Nectar is essentially just a sugary fluid flowers produce to entice bees

to pollinate their species. The bees store the nectar in a special honey stomach separate from their food stomach. Once the worker bee fills this sac, she flies back to the hive.

This foraging bee delivers the nectar to another worker bee through a mouth-to-mouth exchange process. During this process, the moisture content of the nectar is reduced from 70% to 20%. This changes the nectar into honey. Sometimes nectar is stored in the honeycomb cells before being passed mouth-to-mouth because the warm temperature inside the hive causes water content in the nectar to evaporate.

The production of wax

The third step in how bees make wax requires young worker bees engaged in secreting wax to gorge themselves with honey. The wax gland, an organ located on the underside of the last four segments of the body, converts the sugar content of honey into tiny flakes or scales. The worker bees discharge these wax flakes through eight tiny slits in their underbelly. The wax scales are about 3 mm across and 0,1 mm thick, and about 1 100 scales are required to make a gram of wax.

Other worker bees collect the discharged wax flakes, chew it until it becomes soft and malleable, and then mould it to make and repair combs and cap the openings of cells.

> Please turn over

> From previous page

The cost of wax making

Wax making takes a lot of energy – and honey. In spite of several studies, there is no definitive amount of honey used by bees to produce wax. One study suggests that 1kg of beeswax is needed to store 22 kg of honey, while another suggests that bees need to eat 8 kg of honey to produce just 1 kg of beeswax.

Temperature necessary to work wax

The temperature in the hive is crucial in wax manufacture. It should be between 33 to 36°C in order for it to be the right consistency for the bees to manipulate the wax and allow it to be at the right for construction.

If the temperature gets too high, the wax becomes too soft and will not hold its shape. If the temperature reaches 65°C or more, the wax will melt. If the temperature gets too cold, the wax becomes brittle and breaks.

The end cycle of wax production

By the time the worker bee becomes a field bee, the wax glands have totally degenerated. At this point, the worker bee is about 21 days of age.

How is beeswax used?

Bees use the wax they produce to protect themselves against water loss and in the construction of combs and their overall hive.

For thousands of years, humans have used beeswax for a variety of purposes including body care products, food consumption, household uses, industrial manufacturing and many more.

Beeswax is an ingredient in surgical bone wax, which is used to control bleeding from bone surfaces during surgery, and shoe polish and furniture polish may use beeswax. Beeswax



Wax glands on a bee's abdomen.

blended with pine rosin is used for waxing, and can also be used to make cutler's resin, an adhesive used to glue handles onto knives.

In the cosmetic industry, beeswax is used as a non-toxic, natural protectant, hydrating, and thickening ingredient. It thickens creams and make-up, making them more spreadable and easier to use on the skin. Unlike petroleum-based products, beeswax does not suffocate the skin's pores.

Some powerful benefits of beeswax are:

- **As a humectant:** Beeswax attracts water. When beeswax is applied to the skin and lips, it attracts water molecules to that area. This helps to keep skin hydrated.
- **Protective:** Beeswax forms a protective barrier by holding in moisture, reducing dryness, and providing temporary itch relief. It allows the skin to breathe without stripping away the skin's natural oil.
- **Vitamin A:** Beeswax is high in vitamin A which stimulates skin cell production and is an antioxidant.
- **Fragrance:** Beeswax has a pleasant honey scent, non-irritating to most people.
- *This article was based on information from <https://beekeepercenter.com> and <https://en.wikipedia.org/wiki/Beeswax>*

Making beeswax balms is simpler than you think

Making lip and heel balms from beeswax is simple and quick. The trickiest part is sourcing shea butter, essential oils and suitable containers. Shea butter, made from a fat extracted from the nut of the African shea tree, and essential oils can be found at bigger pharmacies, health shops or online at Still Pure or Faithful to Nature. Small glass or plastic containers can be found at outlets such as Bonpak, Plastics for Africa, or Consol (and their web sites).

How to make beeswax lip balm

Ingredients: You will need:

- 2 tablespoons beeswax
- 2 tablespoons shea or coconut butter
- 2 tablespoons coconut oil
- 30+ drops peppermint essential oil

1. Melt the beeswax, shea butter and coconut oil in a double boiler or small glass bowl over a small pot of boiling water, stirring constantly until melted.
2. Remove pan from heat but keep over the

still-hot water to keep the mixture melted.

3. Add essential oils to your preference. Add a few drops at a time and test a tiny amount on your arm until the scent is to your liking.
4. Fill your containers. This must be done quickly since the mixture will start to harden as soon as it is removed from the heat.
5. Let the containers sit at room temperature for several hours until cooled and hardened.

Use an extra teaspoon or two of beeswax if you prefer a thicker and longer-lasting lip balm or slightly less if you prefer a smoother and softer lip balm. Since there are no water based ingredients, you can re-melt and add more of each ingredient during the melting process until you get the exact texture you want.

How to make beeswax heel balm

Ingredients: You will need

- 1/4 cup olive oil)
- 1/4 cup coconut oil
- 1/4 cup cocoa butter
- 25g grated beeswax

- 25 drops peppermint essential oil
- 10 drops lemongrass essential oil
- 5 drops vanilla essential oil
- 5 drops tea tree essential oil
- 5 drops lavender essential oil

Melt the oils, wax and cocoa butter together over medium-low heat in a double boiler or small glass bowl over a small pot of boiling water. If the beeswax you have is a solid chunk, grate it using a cheese grater to allow it to melt faster and keep the oils from warming too much. Add essential oils when the oils and wax are melted.

Pour into a heat-proof container and leave undisturbed for 6–8 hours to cool. Apply after the shower or bath and at night before bed.

Useful links

- www.faithful-to-nature.co.za
- www.bonpak.co.za
- www.consol.co.za
- www.plasticsforafrica.com
- www.stillpure.co.za

Bee space: Mind that gap

In a wild nest, the bees would automatically leave a gap that they don't fill up, which allows them to move freely around. In commercial top bar hive, getting that "bee space" between the frames right is important. *By David Cushman*

"Bee space" is a term that is given to a gap that bees create in a natural nest to enable them to pass freely around their nest. This gap is rarely filled with propolis or comb. This can be seen if a wild colony is taken out of a building or tree.

The Reverend Lorenzo Langstroth is credited with being the first person to have found a use for the bee space, allowing us to have what were called "moveable frames" in a box. This made inspection of a colony very easy and is used in most modern hives.

I have heard it said and written that Langstroth "discovered" or even "invented" the bee space, but of course he didn't. The bees invented it and it was discovered many years before, Langstroth just found a way of using it.

Top bar hives rely on beespace to prevent the bees from fixing comb to the inside of the hive.

What we 'know'

We all "know" that bee space is between 4,5 mm and 8 mm and it is also widely reported as being between 6 mm and 9 mm. However it is not a "variable" quantity; it is either 5,3 mm \pm 0,5 mm or it is 9,0 mm \pm 0,0 mm $-$ 1,0 mm. In other words there are two distinct bands of possible bee space and these occur because in some situations the bees will work individually, but in other situations they need to be able to work back to back.

- A gap of less than 4 mm is too small for any but deformed worker bees to pass through. Any spaces, cracks or crevices of this or smaller dimension will be filled with propolis or sometimes a mixture of wax and propolis and on yet other occasions pollen may be mixed in with the filling (I suspect that this is for reasons of porosity or possibly the transmission of light, but I am not certain).
- A gap of 4,3 mm is a standard European spacing for wires in a Queen Excluder.
- A gap of 5 mm if used between the wires of a square mesh will make an excellent pollen stripper as the workers can get through, but a significant portion of pollen will be stripped from their legs.
- A gap of 5,2 - 5,4 mm is a spacing that can be used to exclude or differentiate Drones, as



Mind the gap: The correct spacing between frames in a top bar hive is important.

Workers and Queens will freely pass, but Drones cannot.

- A gap of 6 mm is the smallest gap that bees will leave between adjacent comb surfaces (outside of the usual clustering area) the bees can defend this more easily and they can work individually within this dimension. The smaller gap around the periphery of the nest, also renders the nest less susceptible to draughts, and may help in maintaining humidity.
- A gap of 7 mm not used by the bees themselves, but some people regard it as a valid bee space to use in some parts of beekeeping equipment. If this spacing occurs between the side faces of frame top bars they are the least likely to suffer from accretions of wax. Frames spaced at 35 mm pitch (normal Hoffman spacing) that have top bars 28 mm in width give rise to this 7 mm gap.
- A gap of 8 mm is a popular bee space among those that design their own equipment as it falls midway between the 1/4" and 3/8" figures so often quoted in old books. I used to be keen on this dimension myself, but I have come to regard it as 'neither one thing or the other' and now I favour 9 mm or in some circumstances 6 mm.
- A gap of 9 mm is the usual space the bees will leave between adjacent areas of capped

brood. This allows two layers of bees to work back to back, usually in an oval pattern roughly in the centre of a frame.

- A gap of more than 9 mm and we are into brace comb territory!
- A gap of 10 mm is practical from a design point of view with the British Standard deep brood frame at 215 mm (some are 216 mm) and the shallow frame at 140 mm. The boxes are then 225 mm and 150 mm respectively, and this gives 1 mm above the frames and 9 mm below (or the reverse if you are like me, top bee space oriented). This may seem large, but it only is this way with fresh equipment. The grain in the frame side bars is vertical and practically no shrinkage will occur in this direction. The box sides however are grain oriented horizontal and the shrinkage will occur in the vertical height of the box. So in use the space is often much less than the initial 10 mm.

In all things there are exceptions - when it comes to the gap between the frame bottom bars in the bottom box and the floor surface underneath it, this is usually 28 mm or 31 mm in UK hives, but it does not suffer brace or burr comb unduly, as the bees consider it a similar situation to a wild nest in a cave.

- *David Cushman. with additions by R.P.*

Byebenutters en die wet

Moet ongeregisteerde byebenutters strafregtelik vervolg word?, vra Ferdie du Preez.

Ingevoege Regulasie R858 gedateer 15 November 2013, uitgereik ingevolge die Wet op Landboupeste (Wet36/1983), is dit 'n kriminele oortreding vir 'n byebenutter om nie ooreenkomstig die betrokke bepalings as "beekeeper" * te registreer nie. Hierdie registrasie moet jaarliks geskied selfs al sou 'n byebenutter net een korf besit.

Verontagsaming van die wetlike bevel

Ten spyte van bostaande wetgewing word daar rofweg beraam dat daar steeds 'n geskatte 2 000 byebenutters bestaan wat die wet willens en wetens oortree deur nie te registreer nie. Regulasie R858 is regtens gepromulgeer vir kennisname deur die publiek. Die afgelope twee jaar is die bestaan van die wet ook wyd in die gedrukte en elektroniese media bekendgestel.

In hierdie stadium bestaan daar nie meer 'n geldige rede dat iemand nog nie kennis van die inhoud van die wet dra nie. Onkunde aangaande die reg is in elk geval nie 'n verskoning nie.

Nadele vir die bedryf

Behalwe vir die onwettigheid van bogenoemde optrede, hou die versuim om te registreer bepaalde nadele vir die bedryf in. Enkele voorbeelde hiervan is:

- Die weerhouding van belangrike data wat vir die administrasie van die bedryf, asook vir strategiese beplanning, noodsaaklik is;
- Die onopspoorbaarheid van korfeienaars wat nie registrasienommers besit nie. Dit bring mee dat elkeen basies kan doen wat hy wil sonder om enige verantwoordelikheid vir sy optrede te dra;
- Die verswakking van die georganiseerde bedryf se vermoë om as sterk bedingingsmag op te tree;
- Onkunde oor die identifikasie en behandeling van siektes. aangesien ongeregisteerdes buite die dampkring van die georganiseerde byebedryf beweeg;
- Die afwesigheid van 'n erkode wat ongeregisteerdes tot etiese waardes en norme verbind, en
- 'n Swak naam vir die byebedryf as geheel.

Moontlike redes vir nie-registrasie

Registrasie is gratis en die vraag ontstaan

waarom die mense nie registreer nie. Ek dink een van die redes is 'n misgissing van die feite. Van hulle glo blykbaar dat SABIO steeds, in plaas van DAFF, vir registrasie verantwoordelik is.

Omdat hulle SABIO (vir watter rede ookal), nie ondersteun nie, is hulle outomaties gekant teen registrasie. Die meerderheid openbaar blykbaar weer 'n ongeërgde. houding. Die belangrikste rede egter, glo ek, is die vrees dat registrasie hulle aan die betaling van inkomstebelasting gaan blootstel.

As jy 'n man regtig skrik op die lyf wil jaag, moet jy net aan sy beursie vat. Hierdie situasie is uiters nadelig vir die bedryf. Sou die regering wou vasstel hoeveel byebenutters daar is wat wel hul belasting betaal, mag daar besluit word om ondersteuning aan die bedryf te weerhou.

Moet daar vervolgings ingestel word?

Moet diegene wat weier om te registreer krimineel vervolg word? Of moet eerder gevra word: Is daar enige rede waarom hulle nie vervolg behoort te word nie? Ek is van mening dat diegene wat in hierdie stadium nog nie geregistreer het nie, uiters moedswillig optree en die gereg openlik uittart.

Die reg maak geen verskil tussen ras, kleur, geloof of beroep nie, wanneer dit by die toepassing van die wet kom. Waarom in hierdie geval 'n uitsondering maak? Is koppige byebenutters dan bo die reg verheve? Hulle behoort soos enige-

Please register

Registration with the Department of Agriculture, Forestry and Fisheries (DAFF) involves completing a simple form and is free of charge.

Registration enables DAFF to assess the state of the beekeeping industry, and the overall health and status of South Africa's bee population.

Registration must be updated annually between 1 January and 31 March, and DAFF will send a reminder.

Download the form from:
<https://www.nda.agric.za/daaDev/sideMenu/APIS/doc/Beekeeper%20Registration%20Form%20DAFF%20%20%20FINAL.pdf>

mand anders wat die wet oortree vervolg te word.

Afwesigheid van vervolgings

Mens is verstom dat daar nog nie strafregtelik teen die oortreders opgetree word nie. Wat kan vir hierdie toedrag van sake verantwoordelik wees? Die belangrikste faktor in hierdie stadium blyk die gebrek aan die nodige mannekrag by DAFF te wees. Om die nodige vervolgings te kan instel vra vir etlike inspekteurs wat dit hul voltydse taak maak. DAFF beskik op die oomblik oor slegs twee deeltydse inspekteurs (een in die noorde, en een in die suide), wat vir die volle toepassing van die wet verantwoordelik is. Behoorlike toepassing van die beheermaatreëls is vir hulle 'n onbegonne taak. Veral die instel van volgehoue vervolgings is buite hul bereik.

Afskrikking

Regulasie 858 maak in die geval van 'n eerste oortreding voorsiening vir 'n boete van nie meer as R4 000 nie, of gevangenisstraf van nie meer as een jaar nie. Indien dit die hof behaag kan beide boete en gevangenisstraf gelykertyd opgelê word. Hierdie is swaar strawwe en behoort as sterk afskrikingsmiddel vir oortreders te dien.

Kan daar nie by wyse van 'n beperkte steekproef vervolging ingestel word nie? Vir hierdie doel kan van 'n kitsdagvaarding (spot fine) gebruikgemaak word wat onnodige hofverskyning kan help voorkom. Indien die oortreder sy boete betaal bestaan daar dan ook geen behoefte om getuies te lewer nie. Dit alles vergemaklik die administrasie verbonde aan die regsproses.

In gevalle van boetes behoort wye nuusdekking daaraan verleen te word. Sodra die boetepleggings onder ongeregisteerde byebenutters bekend raak, behoort dit as doeltreffende afskrikingsmiddel teen verdere oortredings te dien.

Bespotting van die gereg

Die nie-toepassing van regulasie 858 maak dit tans 'n bespotting van die gereg en die byebedryf.

* Daar bestaan slegs 'n Engelstalige weergawe van die beheermaatreëls, en die regulasie praat gevolglik bloot van 'n "beekeeper".

Bees sleep, and may dream

Just like their keepers, bees need their sleep – and a chance to dream. And tired bees can forget their roles or lose their way, wasting time and energy, says Alex Riley.

In 1983 a German researcher named Walter Kaiser discovered that honeybees slept. He noted how a bee's legs would flex, bringing its head to the floor, and its antennae would stop moving. Some bees would fall over, and many bees held each other's legs as they slept.

Since then, research has shown that just like humans, busy bees need their sleep – five to eight hours a day. Forager bees – the eldest of several types of honeybee castes – tend to sleep at night when darkness prevents them foraging. Other castes – cleaners, nurses, security guards and so on – may sleep during the day.

Kaiser's study was the first record of sleep in an invertebrate. But it was far from the last. Now it is known that cockroaches, fruit flies, and jellyfishes all have some form of sleep.

Just like humans, bees that do not get enough sleep do not fare well. Firstly, scout bees do not do their waggle dances accurately. Since their nest mates use this information for foraging, they are likely to be sent slightly astray, wasting time and energy. Sleep-deprived bees also find it harder to return to the hive, and some even get lost. The whole colony suffers.

Without enough sleep, bees start to forget the activities that should be second nature to them. In a 2015 study, Randolph Menzel and his colleagues from the Free University of Berlin provided an explanation as to why this might be.

Slowly does it

As is well-documented in humans, deep sleep (known as slow-wave sleep) consolidates memories, transferring them from short-term to long-term memory. Menzel and his team showed that the same was true for the honeybee.

First, they had to teach them something new; only then could they test the quality of their short-term to long-term memory transfer. They chose a tried-and-tested protocol, developed by Menzel himself in 1983.

When feeding, bees stick out their long tubular mouthparts, or proboscis, known as a proboscis extension response (PER). By presenting bees with a specific odour and burst of heat as they feed, this response can be elicited even when there is no food available.

It is the honeybee equivalent of the famous Pavlov's dog response. Rather than a bell, the



bees associate the odour-heat combination with food and try to feed.

It turned out that it is much easier to condition bees than dogs. Honeybees are quick learners, associating the odour and heat with food after one to three trials. After that, PER happened without the need for a reward.

Once conditioned, the bees were allowed a full night's sleep within individual plastic tubes. As they slept in solitude, the team exposed some of the honeybees to the conditioned odour-heat combo during different sleep stages, ranging from light sleep to deep sleep, allowing any activity in their brains to be further stimulated.

As a control, a separate group of bees were exposed to a neutral odour – paraffin oil – that would not reactivate any conditioned responses.

Did it stick?

When the honeybees woke the next day, the memory tests could begin. Did the bees with the night-time reminders hold on to their conditioned response – sticking out their proboscis – for longer than those without?

Yes, but only when the odour and heat were presented in the deep-sleep stage, as one would expect for human sleep-reinforced memory. Presenting the odour and heat during other, lighter stages of sleep offered no advantage.

Although their bodies might be inactive during deep-sleep, honeybee brains do not seem to be. The previous day's activities are reactivated, converting the day's memories into a more permanent form that can be accessed in the future.

In sleeping rats, memory consolidation has been shown to work like replaying a tape: any learned responses, such as completing a complex maze, are repeated over and over again in the same sequence that they occurred; right turn by wrong turn, neuron by neuron in the brain. Menzel and colleagues' study adds some evidence that the same might be occurring in bees.

With the possibility of memory reactivation in the bees' sleepy heads, Menzel's work begs the question of whether honeybees dream.

All a-flutter

In humans, dreams were thought to be a phenomenon of REM (rapid eye movement) sleep, suggesting that dreaming was limited to mammals, birds, and (more recently) reptiles; animals that have similar eye-fluttering stages of sleep.

But this is not the case. Recent studies have revealed that dreaming can also occur during slow-wave sleep – the honeybees' deep-sleep. When woken from slow-wave sleep, people often recall basic dreams such as a house, faces, or a pet. So if bees dream at all, they might dream of a special odour, or a colour of flowers.

Apis mellifera has been studied ever since Aristotle observed the monarchy of the honeybee colony in the 3rd Century BCE. The more we learn, the more remarkable we realise bees are.

• This article is derived from 'Bees learn while they sleep and that means they might dream', by Alex Riley, on the BBC Earth website at <http://www.bbc.com/earth/story/20160621-do-bees-dream>

Important honeybee forage plants

In the Western Cape, fynbos is an important source of forage, as it always has been. But there are many other plants, both indigenous and alien, that provide valuable sources of pollen.

There is not sufficient bee forage in the Western Cape. Indigenous fynbos areas have been contracting due to agricultural and urban expansion and the spread of invasive plants, and in any event fynbos is not luxuriant enough to support large populations.

Beekeepers are dependent on exotics like eucalyptus, flowering crops, and suburban plants to provide forage sources year-round.

That dependency is problematic, for several reasons. One is that six species of eucalyptus trees which provide excellent bee forage have been targeted as part of DAFF's Working for Water (WfW) programme because they are inva-

sive aliens seen as a threat to natural water sources, and are often cut down without regard to their importance to the honeybee industry.

Another threat is in agricultural trends – the move towards pip-less varieties of citrus and low forage producing canola in particular.

Climate change and the recent drought have been instrumental in the sharp rise in vegetation fires, which have claimed thousands of hectares of fynbos, as well as plantations.

Beekeepers with suitable land can plant bee-friendly forage plants. The tables below, adapted from a beekeeper survey in 2011-2013 that formed part of WCBA chairman Tlou Masehela's

PhD thesis, show the important forage plants in the Western Cape and their flowering seasons.

Plants are not listed in order of importance, and the listings are not exhaustive – the variety of bee-friendly plants in suburban gardens is far too wide to detail here – but the lists are comprehensive and an excellent planting guide.

Beekeepers should also consult local nurseries for information about bee-friendly, water-wide plants suited to their environment.

Detailed information on most of the plants listed can be found at the South African National Biodiversity Institute's excellent Plantz Africa web site at <http://pza.sanbi.org/>.

Main forage category	Sub forage category	Scientific name	Common name	Flowering period	
Indigenous/natural forage	Natural species or species groups	Acacia karroo/Vachellia karroo ^	Sweet thorn	Nov-Jan	
		Agathosma spp.	Buchu	Mar-Oct	
		Aloe ferox	Red aloe	Jun-Jul	
		Aloe marlothii	Mountain aloe	Jul	
		Asparagus spp. ^	Wild asparagus	Sep-Oct	
		Carpobrotus edulis	Sour fig	Aug-Oct	
		Erica spp.	Erica spp.	Apr-Oct	
		Euclea spp.	Guarris	Jan	
		Euryops Virgineus	Honey euryops	Nov-Jan	
		Isoglossa eckloniana	Buckweed	Mar-Jul	
		Mesembs	Mesembs	Aug-Feb	
		Morella cordifolia	Wasbossie	Jan-Feb	
		Olea europaea subsp. cuspidata	Wild olive	May-Aug	
		Oxalis pes-caprae ^	Buttercup oxalis	Jan-Mar	
		Oxalis stricta	Common yellow woodsorrel	Aug-Oct	
		Protea spp.	Protea spp.	May-Dec	
		Scutia myrtina	Cat thorn	Mar-Jul	
		Searsia lancea	Karee	Oct-May	
		Searsia pedulina	White karee	Apr-May	
		Watsonia fourcadei	Watsonia fourcadei	Jul-Sep	
	Zygophyllum spp.		Mar-Apr		
		Vegetation types		Coastal fynbos	Jan-Dec
				Mountain fynbos	Jan-Dec
				Strandveld	Jan-Dec
				Karoo	Jan-Dec
				Indigenous Forest	Jan-Dec
				Namaqualand & Renosterveld	Jan-Dec
				Bushveld	May

* Listed as invasive exotic. ^ Indigenous, but could be problematic in some provinces

Main forage category	Sub forage category	Scientific name	Common name	Flowering period	
Exotic forage	Forestry (Eucalyptus) includes formal plantations and other stands	<i>Eucalyptus camaldulensis</i> *	River red gum	Aug-Jan	
		<i>Eucalyptus cladocalyx</i> *	Sugar gum	Dec-Mar	
		<i>Eucalyptus conferruminata</i> *	Spider gum.	Sep-Mar	
		<i>Eucalyptus diversicolor</i> *	Karri gum	Sep-Apr	
		<i>Eucalyptus / Corymbia ficifolia</i>	Red flowering gum	Sep-Apr	
		<i>Eucalyptus gomphocephala</i>	Tuart gum	Nov-May	
		<i>Eucalyptus grandis</i> *	Saligna gum	Sep-May	
		<i>Eucalyptus / Corymbia maculata</i>	Spotted gum	Feb-Jun	
		<i>Eucalyptus melliodora</i>	Yellow box gum	Aug-Feb	
		<i>Eucalyptus paniculata</i>	Grey ironbark gum	Aug-Oct	
		<i>Eucalyptus sideroxylon</i>	Black ironbark gum	Mar-Sep	
		<i>Eucalyptus tereticornis</i> *	Forest red gum	Aug-Nov	
		<i>Eucalyptus viminalis</i>	Manna gum	Feb-Jun	
	Agricultural crops	<i>Allium cepa</i>	Onion	Nov-Jan	
		<i>Brassica napus</i> var. <i>oleifera</i>	Canola	Jun-Sep	
		<i>Brassica</i> sp. (Broccoli)	Broccoli	Apr-Nov	
		<i>Brassica</i> sp. (Cabbage)	Cabbage	Jul-Aug	
		<i>Brassica</i> sp. (Cauliflower)	Cauliflower	Apr-Nov	
		<i>Citrus</i> spp.	Citrus	May-Nov	
		<i>Cucurbita</i> sp.	Pumpkin	Dec-Mar	
		<i>Daucus carota</i>	Carrot	Nov-Dec	
		<i>Helianthus annuus</i>	Sunflower	Jan-Mar	
		<i>Macadamia</i> spp.	Macadamia	Aug-Feb	
		<i>Medicago sativa</i>	Lusern/Lucerne	Oct-Apr	
		<i>Magnifera indica</i>	Mango	Nov-Jan	
		<i>Malus domestica</i>	Apple	Sep-Nov	
		<i>Prunus</i> spp.	Prune/Plum	Aug-Nov	
		<i>Psidium guajava</i>	Guava	Apr-Dec	
		<i>Pyrus communis</i>	Pear	Sep-Nov	
		<i>Rubus idaeus</i>	Raspberry	Feb-Mar	
		<i>Trifolium</i> spp.	Clover	Jul-Sep	
		<i>Vicia dasycarpa</i>	Purple vetch	Mar-Apr	
		<i>Vitis vinifera</i>	Grape	Dec-Mar	
		Suburban plantings	<i>Quercus robur</i>	English oak	Sep
			<i>Schinus terebinthifolius</i> *	Brazilian pepper	Oct-May
			Various	Suburban gardens	Jan-Dec
	Weeds	<i>Echium plantagineum</i>	Echium/Bloublom	Jul-Dec	
		<i>Hypochaeris radicata</i>	False dandelion	Feb-Apr	
		<i>Leptospermum laevigatum</i> *	Coastal Tea Tree	Aug-Sep	
		<i>Myoporum tenuifolium</i> *	Manatoka	Sep-Nov	
		<i>Prosopis</i> spp. *	Prosopis spp.	Oct-Jan	
		<i>Raphanus raphanistrum</i>	Wild radish	May-Oct	

* Listed as invasive exotic. ^ Indigenous, but could be problematic in some provinces



Beekeeper Registration Form

The information on this form is collected under the authority of the **Agricultural Pests Act, 1983 (Act No. 36 of 1983)** and **Control Measures R858 of 15 November 2013** relating to Honeybees. Any person who keeps, owns, or is in charge of a colony of honey-bees, whether for commercial, hobbyist or as a bee removal service provider is **legally** required to register **annually** with the Department of Agriculture, Forestry and Fisheries (DAFF) as a Beekeeper between 1 January and 31 March of each year. There is no cost involved.

*NB: All fields marked with * are compulsory*

A. Purpose: *	Initial Registration <input type="checkbox"/>	Renewal Registration <input type="checkbox"/>	Notice of Change <input type="checkbox"/>
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B. Information for Postal Communication:

Trading / Business Name (if applicable):	Postal Address (PO Box or Street): *
Postal Town: *	Postal Code: *

C. Information of Contact Person:

Surname: *	Initials: *	Title: *
Email Address:	Cellphone No.: *	Landline No.:

D. Information of Beekeeping Operation:

Province: *	Beekeeping Centre(Town Name): *	No. of Colonies(±):
Registration No. if Previously Registered:	Other Registration No(s). In use by you:	Number of Apiary Sites(±):

E. Beekeeping Activities *

Honey Production <input type="checkbox"/>	Pollination <input type="checkbox"/>	Bee Removals <input type="checkbox"/>	Others (Specify):
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F. Type of Business * (Beekeeper)

Commercial <input type="checkbox"/>	Small Scale <input type="checkbox"/>	Hobbyist <input type="checkbox"/>	Other (Specify):
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G. Types of Bees *

Capensis (Cape honey bee) <input type="checkbox"/>	Scutellata (African honey bee) <input type="checkbox"/>
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H. If you have sold bees or have purchased someone else's, please provide full details: / any other applicable comments:

.....

I. Signed at * _____ on this _____ day of _____ 20__

J. Signature: * _____ Full Names: _____ ID Nr: _____

J. For Office use ONLY
Captured by: _____ Date: _____ Signature: _____ Certificate: Registration Number: _____ Date Posted: _____

WES-KAAPSE
BYEBEDRYFS
VERENIGING

WKBV



WCBA

WESTERN CAPE
BEE INDUSTRY
ASSOCIATION

Ledevorm

01 / 03 / 2019 -- 28 / 02 / 2020

Member Form

.....
(**BESIGHEIDSNAAM / BUSINESS NAME**)

.....
VERTEENWOORDIGER / REPRESENTATIVE

Pos-adres:
PO Address:

Tel :

.....

Faks/Fax :

.....

Sel/Cell :

Epos/Email: **DAFF No** :

>> *Geskrewe kommunikasie sal per epos gedoen word // Written communication will be done by email* <<

MERK ALLE ASPEKTE OP U VAN TOEPASSING / MARK ALL ASPECTS APPLICABLE TO YOU (X) :

- Byeboer / Beekeeper

- Bestuiwing / Pollination

- Gewasverbouer / Crop Grower

- Byeeverwydering / Bee removals

- Ander / Other :

- Stokperdjie / Hobby

Ledegeld / Membership Fee (01/03/2018 -- 28/02/2019)	R 350.00
Addisionele Verwante Persoon * / Additional Related Person * (+ R100.00) :	R .
..... Naam & Epos-adres / Name & Email address	_____
	R .

>> *Betaal so spoedig moontlik na 1 Maart asb // Please pay as soon as possible after 1 March* <<

Bankbesonderhede / Banking details (ABSA, Durbanville) :

Naam/Name : WKBV / WCBA

Tjek-rek / Cheque Acc : 405 063 4154

Tak/Branch : 632 005

Dui u naam duidelik aan op die depositostrokke // Clearly indicate your name on the deposit slip

Betalings-/Payment detail :

Hiermee verklaar ek dat ek die WKBV-grondwet van krag op enige stadium, volledig onderskryf.

I hereby declare that I fully subscribe to the WCBA constitution in place at any time.

DATUM / DATE

HANDTEKENING / SIGNATURE

Ons moet hierdie vorm saam met u betaling ontvang asb ! // We have to receive this form with your payment please

P: Bus/Box 1200, Bellville, 7535

T: 021 865 2050

M: 082 6611 499

E: info@wkbv.co.za

W: www.wkbv.co.za

