SABIO

The South African
Bee Journal
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THE STICKY SITUATION: HONEY ADULTERATIONS

HOW HONEY BEES FEED ON SUGAR

SABIO AGM

NEONICOTINOIDS IN AFRICA: IMPACT ON HONEY BEES

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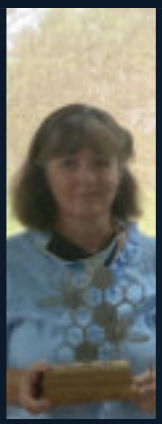
CONTENTS

Cover Images: **Left** masked hony judges at their work. **Right** Dr. Hannelie Human receiving the IH Wiese Award at the SABIO AGM.



SABIO is the official representative of the bee industry of South Africa. Its mission is to "represent and promote the interests of all persons involved in the beekeeping industry in South Africa in order to establish, support and develop an economically viable and sustainable apicultural sector and ensure the environmental security of the honey bee".

Editorial

This issue of the journal marks the last issue of the first full volume that has been prepared and published by the new editorial team. It has been a valuable experience and we hope that interesting topics have been covered. The *capensis* issue (Vol 92, No 2) will hopefully be seen as a useful guide to the natural history and treatment of the *capensis* social parasite that can be used by all beekeepers as a valuable guide to managing their colonies, and by those who provide training to beekeepers in the future as a source of reliable information. This issue was produced in collaboration with DALRRD and represents a significant collaboration between a regulator and the industry that is subject to this regulation.

The SABIO AGM of was held on Saturday 5 December at Eddy Lear's small holding south of Johannesburg and was marked by a good attendance in person by various members of the organisation. Although it was a hybrid meeting with a mixture of those physically present and those attending remotely, those physically present gained most from the occasion. Not only was it a chance to hear a report from the Chair in person and to vote for the new members of the committee, there was also a chance to visit the honey and mead show, admire the diversity of honeys and meads being exhibited, have discussions with judges, and congratulate the winners in the various categories. More about both these topics will be discussed later in this issue.

We will address three other important topics. The first is a report of a fascinating recent study that has explored the way in which honey bees feed on sugar. Their mouthparts are carefully constructed in order to ensure that they are able to harvest sugar for their diet very effectively. The way in which they handle sugar in solution (nectar) and also granules of sugar will give us new insights into feeding bees. The second topic deals with analysing for adulterated honey. This is an on-going threat to the integrity of the honey industry and requires much more focused attention and regulation. The third topic deals with the use of neonicotinoid insecticides in South Africa and their effects on honey bees. Members of this class of insecticide have been banned in Europe largely as a result of their effects on honey bees. However, no such ban is being considered locally at the moment.

Finally, the success of the South African Bee Journal rests on the flow of material that is offered to the journal for publication. We are keen to hear from beekeeping authors who wish to offer material to the journal to be considered for publication. In wishing all of our readers well over the Christmas period, we hope that you will use the holiday period to produce an article for consideration in the New Year.

Robin M Crewe

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CHAIRMAN'S REPORT
SABIO ANNUAL GENERAL MEETING

SATURDAY, 28 NOVEMBER 2020

Short Review of the Bee Industry's Operating Environment

Where are we as an Industry and Industry Body?

What do you know about:

The ARC vision 2050?

The DALRRD and the National Development Plan 2030?

The IDC Youth Pipeline Development Programme?

NEPAD Agenda 2063: The Africa We Want?

Perhaps we should at least take note of these strategic documents as they will surely impact our beekeeping operating environment.

Over the past few years, we as an industry, have witnessed a growing interest in beekeeping in South Africa. This is due in part to increased use, availability and promotion through social media platforms within the hobby and small-scale beekeeping sector. If SABIO wants to stay 'relevant' we must find ways to reach these beekeepers. Furthermore, SABIO needs to consider more effective regulation of beekeeping in this country. Models are available in other countries (or even other industry bodies operating in South Africa), that demonstrate how beekeeping is monitored and strictly regulated, based on competence to carry out beekeeping activities. Stricter measures need to become more important in all sectors of our industry, from the bee removal business, which is totally unregulated, uncontrolled and currently inundated with persons claiming to be "bee removal specialists", to specialised pollination services. If we, as an industry, do not take the initiative other industries will do so on our behalf.

Perhaps the biggest concern is how we should 'accredit' or 'approve' industry members, be they bee removers, pollinators, trainers or simply beekeepers selling honey and needing to have their honey authenticated.

Beecon 2020

Covid-19, Covid-19 and again Covid-19..... When you open websites, postponement and cancellation of events have become the order of the day from the 12th International Pollination Symposium originally scheduled for September 2020, Association meetings, to our Flagship event, the annual Beecon being affected. We trust 2021 and beyond will be kinder to these activities!

Bee Journal

This year we welcomed a new editorial team under the leadership of Prof Robin Crewe and Dr Hannelie Human. Their contributions and work had a huge impact on the publication of the Bee Journal; from the overall look to the content. Extremely positive comments have been received from beekeepers.

I would like to take this opportunity to thank Robin, Hannelie and the team. As Chairman, I do appreciate these contributions and, most importantly, it alleviates one of the biggest headaches of any chairman in office. Not only did we catch up on last year's outstanding edition but we shall close this year with all editions printed and distributed. For making this possible I wish to thank all our contributors as well as every advertiser, big and small and in particular Bayer, Starke Ayers and Consol. Also, to Jaco Wolfaardt for buying 200 bulk copies per issue to re-sell at different outlets.

Perhaps the most frustrating aspect in terms of the Bee Journal this year has been the late arrival of copies to your post box. We forgot that the postal services were closed during much of the Covid-19 period. In this regard Kobus Kemp holds the record for his journal arriving 3 months after it was posted! Of the journals mailed only 7 made it back to the sender, the others are still somewhere in the distribution loop.

Board and Board Meetings

Board meetings started off well with the first meeting held in November 2019, followed by another in

January 2020 after which we made the trip to Paarl for the March Board meeting. At this meeting the Western Cape Bee Association Chairperson Dr Tlou Masehela and Mike Allsopp of the Agriculture Research Council joined us. Some Board members also used this opportunity to attend the Western Cape Bee Association Annual General Meeting to meet and interact with members.

Unfortunately, Board meetings thereafter collapsed due to Lockdown and travel restrictions. Although Zoom meetings were arranged these were unsatisfactory as connections were not as reliable as one would prefer.

Capensis Workshop November 2019

The Department of Agriculture, Land Reform and Rural Development (DALRRD) (formerly DAFF), assisted by SABIO Board member Louis van Zyl, organised a well-attended Capensis workshop during November 2019. One of the outcomes of the workshop was that, after almost 30 years post the emergence of the Capensis bee problem, few beekeepers understand the background and origin of the calamity. It was therefore decided that SABIO and DALRRD would join forces and publish a special edition of the Bee Journal devoted to this subject.

SABIO wishes to thank DALRRD for carrying the printing cost of this special edition.

Covid-19 and Bee Movement Permits

Perhaps one of the most controversial topics during the Covid-19 Lockdown has been the issuing of bee movement permits. The Minister of Agriculture recognised the importance of beekeeping at commercial level and announced the need for bee movement permits via national television. Nonetheless, SABIO received strict instructions from DALRRD for permits to be issued on a 'needs basis', especially during the Level 5, 4 and 3 periods.

At the time of Lockdown Level 3, DALRRD gave permission for provincial Beekeeping Associations to assist SABIO in issuing permits to beekeepers.

No applications received by SABIO were rejected.

The system of permits received international support from the FAO, Apimondia as well as professional and other beekeepers alike.

Finances

The SABIO finances are in good order and, at present, we have added almost R300,000.00 this year to the kitty, with all expenses paid up to date.

The question should then be asked, what will SABIO do with these accumulating funds? Although these are not millions (as is the case with some other industry bodies), it does allow us to initiate one or two smaller projects such as:

a beekeeping census – the last partial census was conducted about 2008

re-publication of the POSA North Guideline on pollination practices which is desperately needed at this point in time

support for one of the beekeeping development projects

fake honey awareness campaign including symposiums/workshops

establishing guidelines for a Code of Ethics

These suggested smaller projects also touch on the proposed Constitutional changes as well as an agenda item requested by Mike Miles, namely remuneration of SABIO officials.

Honey Judges Guild and Honey Show

The beauty of our honey varieties was on show at the Honey Show that preceded the SABIO AGM. I would like to congratulate all those who made time to enter, stage and at the end judge those entries.

Congratulations to all our winners.

A separate report will be circulated by the Honey Judges Guild.

Impumelelo and Fake Honey

The flow of emails between Impumelelo and SABIO has been open and a good exchange of information has taken place. Once again, official meetings were abruptly made impossible due to the Covid-19 Lockdown.

One issue that needs desperate attention is the question of who is to pay for analysis when fake honey is reported and, following that, to whom will the results be made known?

I strongly believe to fight this will need a determined effort by both SABIO and the retail industry to educate beekeepers and the public at large,

supported by DALRRD as the enforcer and Impumelelo as the designated inspector.

To give just one example on how difficult this is: one of the biggest alleged fake honey suppliers changes labels before we even receive test results from the laboratories which then forces those complaining to test each and every newly labelled product on the market.

Membership

Membership has increased significantly and now stands at approximately 340 members, including 30 professional and 5 corporate members.

SABIO Website

Updating the SABIO website is one activity we have completed during this year. It is vibrant, with new pages, new content and many, many new photos.

One of the big surprises is the special section that recognises our professional and corporate members. This is already viewed as a quick reference/ confirmation guide for growers looking for pollination providers.

The latest addition is the special webpage dedicated to honey under the umbrella of the Honey Judges Guild.

Beyond 2020

2021: CENTENARY OF ORGANISED BEEKEEPING IN SOUTH AFRICA

With the Centenary of Organised Beekeeping in mind, we should perhaps make use of this opportunity to take SABIO to different regions to connect with beekeepers and the Beekeeping Industry. At present we combine all these activities in one single national event. Why not have multiple events in different regions which would make SABIO more visible and accessible to members? Potential meetings that could achieve this objective are:

World Bee Day - 20 May 2021

Royal Show 2021 - May 2021

Beecon 2021 - June 2021

SABIO AGM 2021

National Honey Show 2021

Nampo Alpha - September 2021

Regional Beecon 2022

Apimondia Ufa, Russia – Aug 2022

I thank you for giving your attention to this 2020 Chairman's Report.

Adriaan du Toit (Ph.D.)

Chairman SABIO Board of Directors

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How do honey bees feed on sugar?

Sue Nicolson, University of Pretoria, South Africa and Jianing Wu, Sun Yat-Sen University, China

Sugar is essential to honey bees as an energy source for flight, thermoregulation and development. They obtain it mainly from nectar, which is basically a simple sugar solution. Although nectar also contains other ingredients such as amino acids, they are present in far lower amounts than sugars.

Bees prefer concentrated nectars (30-50% sugar on a weight basis). The higher energy content reduces the load to be carried, and less evaporation is needed for conversion to honey. However, as the concentration of nectar increases there is a point at which it becomes hard to drink: this is because the viscosity of sugar solutions increases exponentially with concentration. Think of honey. Temperature also affects viscosity, higher temperatures making sugar solutions thinner, which is essential for handling honey.

Here we discuss new research on how honey bees drink and how this process is affected by the properties of nectar. We also show how bees deal with dry sugar, even though natural selection has led to the tongue being designed primarily for a liquid diet.

Structure of the honey bee tongue

The mouthparts of a honeybee that are involved in drinking consist of a pair of galeae, a pair of labial palps and a glossa (Fig. 1A-C). The glossa bears thousands of long hairs, which play an important role in trapping nectar. They expand outwards as the glossa is extended into nectar, so that the glossa acts as a mop for loading nectar. The hairs remain erect as the bee withdraws the glossa into a food canal formed when the galeae and labial palps come together. The drinking mechanism used by bees is known as viscous dipping. It is very different from the suction mechanism used by butterflies, which resembles drinking through a straw.

The drinking mechanism of honey bees has been studied in detail by mechanical engineer Jianing Wu and his colleagues at Sun Yat-Sen University in Guangzhou and other Chinese universities. Basically, a previously starved forager bee is positioned at a feeder so that the movement of its tongue can be filmed through a microscope with a high-speed camera (Fig. 1D). Videos of feeding by individual honey bees under different conditions are then analysed, and the observations are supplemented with mathematical models.

Warmer and less viscous nectar is preferred by bees

In earlier experiments in the apiary at the University of Pretoria's experimental farm, we offered artificial nectar at different temperatures and viscosities to honeybee colonies. These experiments were done on cold winter mornings. Nectar was warmed by a heating pump beneath the feeders. Nectar viscosities were increased by adding small amounts of the inert polysaccharide Tylose™. This substance, used commercially to thicken foods and water-based paints, among other things, changes the viscosity of a sugar solution without changing its concentration.
Firstly, the crop loads of individual bees, obtained by inducing them to regurgitate, increased when they were offered nectar that was warmer than air temperature. So did the amount of sucrose solution

consumed by the colony. Food consumption by the colony is the product of crop load and the number of foragers visiting the feeder, and the preference is amplified as more bees are recruited. Secondly, crop loads and total consumption declined as nectar viscosity increased. Bees preferred thinner nectar and avoided the higher nectar viscosities.

High-speed videos show that warmer and less viscous nectar is easier to drink

These experiments under semi-field conditions suggested that it would be interesting to use high-speed videos to look at viscous dipping of cooler and warmer sucrose solutions, as well as solutions of different viscosity. We used a heating pad on the microscope to maintain the temperatures of sucrose solutions, and Tylose to change the viscosities.

The different stages of a dipping cycle, obtained from high-speed imaging, are shown in Figure 2. The cycle is very fast, lasting about 200 milliseconds. First, the tongue, with flattened glossal hairs, extends through the tube formed by the galeae and labial palps. When it reaches the maximum extension the glossal hairs start to erect and trap the nectar between them, and remain this way as the glossa is retracted. The nectar is finally loaded into the food canal at the end of the cycle.

Changes in temperature and viscosity of the sucrose solutions had clear effects on the speed of dipping. For example, the dipping cycle shown in Figure 3 lasted 212 milliseconds when the bee drank 35% w/w sucrose solution at 20°C, but speeded up to 155 milliseconds when the same solution was warmed to 40°C. By adding Tylose to maintain nectars of different concentration at a constant viscosity – the viscosity of a 45% sucrose solution at 25°C - we showed that the dipping speed stayed constant. This means that when bees drink different sucrose concentrations at different rates, they are responding to the difference in viscosity, not concentration.

Bees respond to variation of nectar properties by regulating the dipping frequency of the tongue. The highest energy intake occurs at high temperature and low viscosity. Of course, the effects of temperature and viscosity are linked because warmer nectars are less viscous. Another advantage of drinking warm nectar is that bees will benefit from reduced thermoregulatory costs during foraging.

As a local example, aloes are a major winter food source for honeybees in the summer rainfall parts of South Africa (Fig. 4). The copious nectar of *Aloe greatheadii* var *davyana* is relatively dilute, around 20%, so it offers the advantage of low viscosity. It is available all day and foraging honey bees benefit from the warm midday and afternoon temperatures during flowering. We assume that the nectar temperature is close to air temperature. Bees on the aloes are thus foraging on abundant warm nectar of low viscosity.

Feeding on dry sugar is difficult

Supplementary sugar feeding is sometimes needed when nectar is scarce and colonies need strengthening. Sugar feeding is common in colder climates (China, North America and Europe), less so in South Africa. Sugar is usually fed in solution, as a thick syrup, but is sometimes fed as dry sugar (an easier option) (Fig. 5). In this case beekeepers know that a water source must be available. This is because sugar needs to dissolve in water before a bee can eat it. In the hive, granulated sugar becomes damp on the surface when in-hive moisture condenses on it. The surface layers dissolve and the bees can then lap it up like syrup.

High-speed videos demonstrate how honey bees use their tongues, designed for liquid feeding, to feed on dry sugar granules when no water is available. The hairy tongue of the bee moves back and forth to create a groove on the dry sugar (Fig. 6), and saliva is simultaneously used to dissolve the sugar.

When a direct comparison was made between feeding on dry sugar and sugar solution, the lapping frequency of the tongue on dry sugar was only one third of that on sugar solution. Modelling shows that the net energy intake rate when feeding on dry sugar is 50% lower than when feeding on sucrose solutions. It is not surprising that honey bees prefer nectar or syrup to solid sugar.

The friction forces measured for bees feeding on dry sugar are approximately five times those for dipping nectar. The roughness of the sugar groove created by repeated licking is clear in Figure 7. Moreover, when we measured the length of the glossal hairs, they were seen to wear four times faster when bees fed on dry sugar than when they drank sucrose solution. (These hairs are also significantly worn in older worker bees.) Not only is feeding on dry sugar inefficient, but it leads to wear and tear of the tongue. These are strong arguments for using sugar syrup, not dry sugar, when supplementary sugar feeding is required.

This work has combined behavioural and mechanical tests with mathematical modelling. It highlights the advantages of using multidisciplinary approaches to uncover the details of feeding physiology of honey bees and guide beekeepers in the use of appropriate supplementary feeding. .

Articles of interest

Nicolson SW, De Veer L, Köhler A, Pirk CWW. 2013 Honeybees prefer warmer nectar and less viscous nectar, regardless of sugar concentration. Proc. R. Soc. B. 280, 1-7.

Shi L, Nicolson SW, Yang Y, Wu J, Yan S, Wu Z. 2020 Drinking made easier: honey bee tongues dip faster into warmer and less viscous nectar. J. Exp. Biol. 223, jeb229799.

Liao C, Xu Y, Sun Y, Lehnert MS, Xiang WQ, Wu J, Wu Z. 2020 Feeding behaviour of honey bees on dry sugar. J. Insect Physiol. 124, 104059.

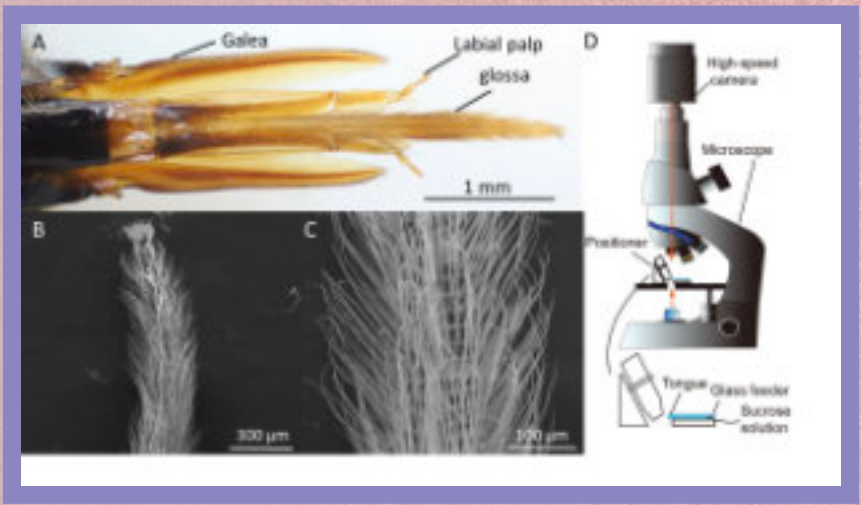

Figure 1. A-C. Honeybee mouthparts, including scanning electron micrographs of the glossal hairs. D. Experimental setup.

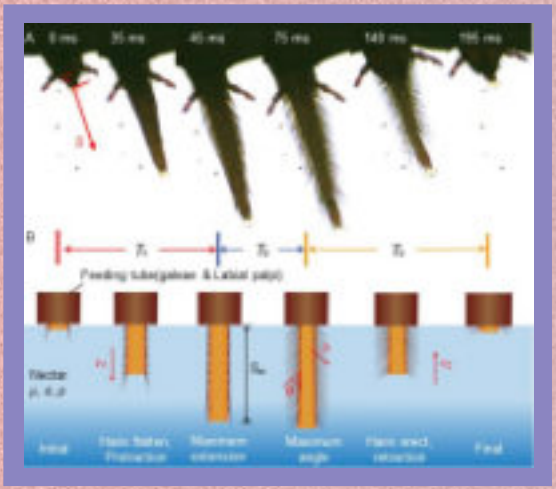

Figure 2. Dipping cycle of the bee tongue.

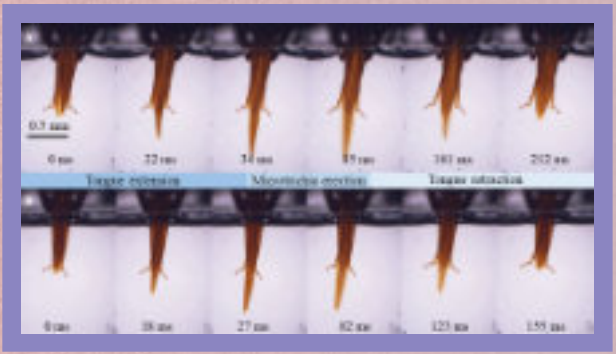

Figure 3. Honey bee tongue dipping cooler and warmer 35% sucrose solutions. (A) 20°C. (B) 40°C.

Figure 4. *Aloe greatheadii* var *davyana* in flower north of Pretoria. Photo by Per Kryger.

Figure 5. Dry sugar fed to honey bees. Photo by Robert Post.

Figure 6. Licking in one position creates a groove on dry sugar.

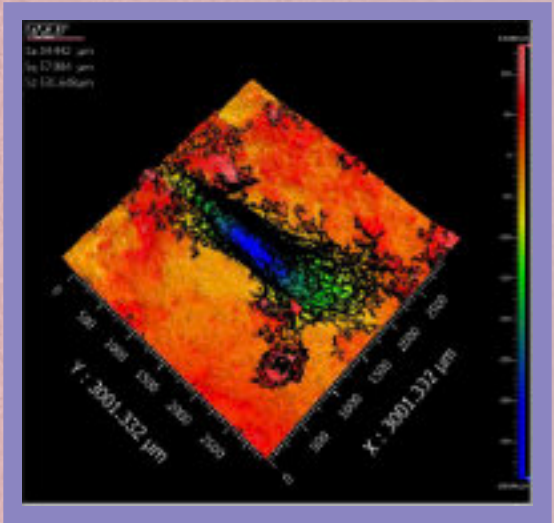

Figure 7. Microstructure of the groove in dry sugar. This 3D image was scanned by white light interferometry. This groove was licked by the honey bee 150 times.

The Sticky Situation: Honey adulteration and quality in South Africa: how to tackle this problem

By: G Hall, University of Pretoria

The adulteration and falsification of high end foods and beverages such as olive oil, vanilla, cheese and wine is a global problem that costs producers and consumers substantial amounts of money. This may be referred to as economically motivated adulteration (EMA) and is strongly associated with expensive products. Honey ranks globally as the third most commonly adulterated food. The adulteration of honey is carried in different ways such as improper production methods, mislabelling and the addition of poor quality honey to bulk up yields or the incorporation of different kinds of sugar syrups. The most common adulterants used include corn syrup (CS), high-fructose corn syrup (HFCS), glucose and sucrose syrups, inverted syrups produced from either sugar cane, sugar beets or rice. Other plant syrups such as banana, sweet potato, palm syrup and must syrup (grapes), as well as adding cheaper honey can also be used.

The South African honey market is no exception and the problem of adulterated honey has recently become an area of public concern with extensive media coverage (Chetty 2019; Donnelly 2018). The South African Bee Industry Organization (SABIO) has also repeatedly expressed its concern as the occurrence of adulteration has a major effect on the local industry (Phillips 2016, Walker 2017). Based on data from the National Agricultural Marketing Council (NAMC) in 2014 (Languza 2014), South African honey production is not able to meet local demands. This means local producers have to import honey from sources outside South Africa (Bhana, 2019), with the majority of imports coming from China (largest honey exporter globally) and several African countries such as Angola, Ethiopia, Tanzania and Zambia. Currently the major concern is the quality and authenticity of both imported and locally produced honey, as this has an effect on the consumer perception and confidence in these products. This can be particularly detrimental to small scale producers in South Africa, The problems facing South African honey production has been affected by a decline in honey production owing to a decrease in the number of local beekeepers (Preuss, 2019), declining numbers of managed colonies, the effects of a range of pathogens and parasites on overall honeybee health issues and the effects of low rainfall, increasing frequency of droughts and veld fires (Langenhoven 2018; Pirk et al 2014, 2016).

Fortunately it is not all "doom and gloom" and in this short article, the intention is to provide some insight and suggestions in order to mitigate the negative effects of adulteration on consumer confidence and to assist South African honey producers to ensure their products are compliant. This is, however, not a simple task for southern Africa and there are a multitude of factors to consider, including environmental and climatic variability, richness of floral diversity, availability of and access to suitable facilities/ technology/technical staff and dissemination of correct knowledge to all involved.

Honey adulteration and authentication

Fig. 8 Honey samples being prepared on the left for stable isotope analysis on the mass spectrometer shown on the right.

Natural honey should be primarily composed of water, glucose, fructose and sucrose, but will also have numerous other substances in various proportions. These include minerals, amino acids, enzymes, vitamins and aromatic compounds. There are a number of factors that will have an effect on the quality and overall composition of a honey and include regional and seasonal climatic conditions, geographic area, botanical origin, as well as processing and storage methods. These environmental and chemical characteristics of honey can be used to define honey quality and detect potential adulteration.

There are a number of internationally accepted methods which can be used to detect adulterated or fraudulent honey products. Many of these are used to determine levels of adulteration and tracing geographic origin, based on the elemental, chemical and isotopic composition of a honey and how these may be affected by production methods, local environmental and climatic conditions and the addition of adulterants. These analytical techniques require a high level of specialised knowledge and sophisticated equipment and currently most questionable honey samples have been sent to overseas laboratories for verification. The knowledge of suitable internationally accepted analytical methods, laboratories and hence accessibility available to producers, consumers and researchers in South Africa is currently not well disseminated amongst potential stakeholders. This, however, does not mean that there are no facilities available. There are several South African laboratories capable of sophisticated analytical techniques. One of the more commonly used analytical methods used to detect adulteration and determination of geographic origin is stable isotope analysis (figure. 8).

Stable isotope applications to determine honey authenticity and detect adulteration

South African honey quality and adulteration researchThe most common isotopic analysis utilises measures the ratio of the ^{13}C isotope to the ^{12}C isotope in a honey sample and is referred to as stable carbon isotope ratio mass spectrometry (SCIRA). The SCIRA method is based on how distinct carbon isotopic compositions of plants are a reflection of the photosynthetic pathway used by plants and these processes are extremely well understood, based on decades of research. There are three photosynthetic pathways used by plants, C_3 (Calvin cycle) employed by most plants, C_4 (Hatch-Slack cycle) in most grass species including maize and sugar cane and CAM (Crassulacean acid metabolism) utilised by succulent species such as aloes. These pathways utilise atmospheric carbon dioxide (CO_2) in specific ways and this results in C_3 and C_4 plants having significantly different $^{13}C/^{12}C$ ratios. It is these clear differences that allow one to easily distinguish between two of the plant types. Succulents (CAM) such as aloes are more complicated due to their photosynthetic pathway. C_3 plants have $\delta^{13}C$ values ranging from –34‰ to -23‰ and C4 plants have $\delta^{13}C$ values from –9‰ to -17‰. These distinctive carbon isotope values can be seen in the carbon isotopic composition of honey and can allow one to detect the presence of C_4 sugars, and provide an indication of potential honey adulteration.

South African honey quality and adulteration research

In order to ensure that South African honey and related products are of appropriate quality, the Department of Agriculture, Land Reform and Rural Development (DALRRD), defined and gazetted a series of regulations and requirements to which honey should comply. These include specific labelling requirements and tests to determine the quality, ripeness and composition of honey in relation to product grading (DAFF 2000). The labelling regulations require the following information to be on the product label; the product name, including the type of honey and the geographical or topographic location, producer details, country of origin and if the product contains sugar cane honey and the proportion thereof.

To date, there has not be a substantial amount of SA-based research dealing with issues of authentication and botanical and geographic origin of southern African honey and related products. Small sample sets have been analysed at overseas facilities as part of larger projects. In terms of adulteration issues, to date only a few local investigations have been carried out. Where there have been cases of suspected adulteration, more often than not, samples were dispatched to laboratories overseas for verification.

The potential of using stable carbon isotope analyses by local laboratories, as a means of detecting adulteration in South African honey was initially explored as early as 1987 as an informal survey with the aim to develop the SCIRA method as an analytical tool for the South African food industry. Unfortunately this was not taken further with the local honey industry as can be attested by the fact that only

in 2018 were local honey producers made aware of the method, although it was not well understood. Between 2014 and the present, several local studies were carried out and the $\delta^{13}C$ values for honey samples analysed had a very broad range of between -27.8‰ to -14.5‰. This is due to the diversity of potential flora exploited by bees, the substantial geographical area, variable climatic zones and adulteration of some of the honey samples. These are important factors to consider when assessing honey from southern Africa and are not necessarily taken into consideration by overseas analysts

Another internationally accepted method used to measure the purity, botanical and geographic origin of honey is melissopalynology, the analysis of pollen contained in honey. The combined use of melissopalynological analyses and SCIRA of South African honeys will prove to be a powerful means to detect adulteration and allow classification of a range of uniquely South African honey based on their botanical composition and geographic location.

There is no doubt that SCIRA is a sound method to detect potential adulteration and characterize geographic origin of honey. In order for the method to be appropriately utilized in the South African context, further work and capacity building is required. Currently there are only three laboratories in South Africa with the necessary staff and equipment to carry out stable isotope analyses and the demand for this kind of work is high across a wide range of research projects. Carbon isotope analytical services are available at the University of Pretoria Stable Isotope Laboratory and suitable testing procedures are being developed using the latest international methods and via collaboration with a number of collaborators, including colleagues at WITS and UCT

We need to implement the full AOAC method of bulk and protein isotopic analyses, as well as combine several analytical methods, such as GC-MS and pollen analyses. This will require collaboration between stakeholders and South African laboratories. An ideal situation would see the generation of a diverse data set of honey isotopic data reflecting seasonal local climatic and environmental conditions across South Africa, as well as pollen data and results of other analytical methods currently available (e.g. GC-MS, NMR spectroscopy). This data and information needs to be communicated to both the local honey producers and those responsible for quality control.

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“BEEKEEPING STANDARDS ARE POOR TO VERY POOR”

Mr Nico Langenhoven, a well kown, experienced and respected figure in the beekeeping industry shares his thoughts on the quote by the Western Cape Department of Agriculture (Elsenburg) in their report “Sustaining the Honey Bee Population and Apiculture in the Western Cape”. Not only do the concerns about meeting the increasing demand for pollination services remain, but also the dearth of nectar and pollen sources, pesticide poisoning as well as vandalism. How do beekeepers address these challenges and have they adapted their beekeeping practises to the changing agricultural environment? Do beekeepers ensure sufficient ventilation during transport of hives? Do they supply their hives with supplementary nectar and pollen? Maybe it is time to start thinking about these challenges, obtain and apply information. Success comes at a price.

Hierdie aanhaling uit die Bye ïndustrie strategie verslag deur die Wes-Kaapse Departement van Landbou (Elsenburg) is uitgereik in Oktober 2017. (volledige verslag “Sustaining the Honey Bee Population and Apiculture in the Western Cape”. Sien swakpunte, heel bo, op bls. 23). Die eerste wat in die gedagte opkom, is die aanhaling net van toepassing op die Wes-Kaap, of geld dit vir al die provinsies van Suid Afrika? Sedertdien het dit duidelik geword dat dit ‘n landswye probleem is.

Met die uitreik van die verslag was daar groot bekommernis dat die getal kommersiële byeswerms nie voldoende sal wees om in toekomstige vraag na bestuiwingsdienste te voorsien nie. Die tekort aan bestuiwingseenhede het toegeneem. Groter aanvraag vir bestuiwing van landbougewasse en korfgetalle wat nie genoegsaam vermeerder het nie, Is voor die handliggend. Probleme wat destyds aangespreek is, is nog steeds van toepassing. Die belangrikste hiervan was, en is nog steeds, ‘n tekort aan genoegsame natuurlike nektar- en stuifmeelbronne, vergiftiging deur die gebruik van landbouchemikalië en kommerwekkende toename in vandalisme.

Hoe moet die probleem vorentoe benader word? Die algemene opvatting is dat niks is volmaak nie tog is niks onmoontlik nie. Om ‘n projek of probleem aan te pak is ‘n geheelbeeld nodig. Hoe het byeboere die afgelope dekade hul besigheid gesien? En belangrikste is, het ons saam met die nuwe tendense verander en aangepas om nuwe uitdagings te oorkom? Die antwoord hierop is nie positief nie.

Kan die plaaslike omgewing groter getalle byeswerms akkommodeer of anders gestel, is dit ekologies haalbaar om byeswerms onbeperk te vermeerder? Waarskynlik nie. Is byeboere se huidige bestuurspraktyke voldoende om die uitdagings die hoof te bied? Hier is die antwoord ook negatief. Byeboere se gedrag is menslik en probleme word gewoonlik verskuif of selfs geïgnoreer. Die tyd het aangebreek waar byeboere selfondersoek moet instel. Hoeveel byevrektes is aan hul eie toedoen te wyte? Nuwe tye en omstandighede bring nuwe uitdagings en nuwe tegnieke word vereis.

Eerstens moet daar gekyk word na algemene korfbestuur en as beginpunt kan byeboere weer die bekende Blouboek, of te wel “Beekeeping in South Africa” deur M F (Martin) Johannsmeier lees. ‘n Volgende punt is of byekorwe tydens vervoer goed geventileer is om te verseker dat swerms nie versmoor nie. Hierdie is ‘n groter probleem as wat byeboere oor die algemeen besef. Daar bestaan geen “beste praktyk” vir die vervoer van byeswerms nie. Selfs een van die die Wes-Kaapse byeverenging se bestuiwingsstandaarde meld dat korwe behoorlik geventileer moet wees tydens vervoer. Nêrens is daar egter enige aanduiding oor presies wat hiermee bedoel word nie. Enkele van vele verslae uit die veld die afgelope bestuiwingsseisoen dui op groot verliese van byeswerms tydens vervoer, of daarna, vir bestuiwing. In die eerste geval het ‘n byeboer 10 korwe na kanola verskuif. Al 10 swerms het versmoor tydens vervoer.

Nuwe tegnologie in vrugteproduksiemetodes het oor die afgelope 5 jaar of meer ook verander. Hier het die aanbring van

oorhoofse nette en kweekhuise sekerlik die grootste invloed op die oorlewing van bestuiwingseenhede. Die ontwerp van hierdie konstruksies en plasing van korwe het 'n groot bydrae tot vrektes. In 'n volgende geval is meer as 100 swerms , binne 4 weke na plasing in 'n bloubessienethuis vrek. Dit was meer as 50% van die totale aantal swerms. Die presiese oorsaak is onbekend. 'n Groot moontlikheid is dat die werkerbye nie die korf verlaat het nie en dat die bye hul voedselreserwes opgebruik het. Die blaam hiervoor moet eerstens op die skouers van die byeboer geplaas word. Byeboere is dit eens dat bestuur moet verbeter en aangepasword by huidige omstandighede.

Die voer van bye, suikerstroop en stuifmeel, speel nog 'n ondergeskikte rol in die bestuur van byeswerms in Suid-Afrika. Om swermgetalle te handhaaf en te vermeerder moet deel wees van enige byeboer se bestuursprogram. In Amerika word dit op grootskaal toegepas om swermgetalle te verdeel en op bestuiwingsstandaard te kry ten einde die groot aanvraag vir amandelbestuiwing in Kalifornie te verseker.

Daar is ook vele berigte in die nuusmedia oor die ontwerp van sement korwe vir beskerming van byneste teen vandalisme. Dit is dalk 'n goeie metode. Of sementkorwe die ideale ontwerp is moet egter nog wetenskaplik bewys word. Byeswerms doen beter wanneer hulle hoër as grondhoogte geplaas word. Dalk is hier die hulp van 'n ingenieur nodig.

Opsommend: Byeboere moet hand in eie boesem steek om probleme te oorkom. Win inligting in en pas dit toe in jou eie besigheid. Sukses sal slegs verseker word deur persone met 'n bogemiddelde werkywer. 'n Interessante program om te volg is MEGABOERE op TV, kanaal 144. Sukses kom nie maklik nie.

Neonicotinoids in Africa

BY MICHAEL NORTON, KHUTSO PHALANE, NINA HOBBHAHN | 10 SEPTEMBER 2020

Neonicotinoids have become the world's most widely used group of insecticides. Also known as neonics, they have lower human toxicity than the insecticides they replaced, and their systemic action renders all parts of the growing plant toxic to insect pests. However, in the last decade it has become apparent that these compounds also have serious side effects. The active agent spreads into pollen and nectar in flowering crops, and the neurological blocking mechanism through which the neonic works harms beneficial insects, including pollinators such as bees, hoverflies and butterflies. Moreover, most of the active agent 'leaks' into the environment, causing collateral damage to a variety of beneficial organisms that provide invaluable 'ecosystem services' such as pest control and soil formation that increase agricultural productivity and crop quality. EU member states banned the three main neonicotinoid agents (imidacloprid, clothianidin, thiamethoxam) in 2018 and discontinued approval for a fourth agent, thiacloprid, in 2020. The question arises whether similar restrictions would be justified in other regions of the world – for instance in Africa, where there are limited data available on the use and effects of these pesticides.

There is widespread neonic contamination of honey and pollen

To answer this question, the InterAcademy Partnership (IAP) worked with the European Academies' Science Advisory Council (EASAC) and the Network of African Science Academies (NASAC), led by the Academy of Science of South Africa (ASSAf), to bring together African experts in two workshops to examine the available evidence across Africa. Experts from 17 African countries from all geographical regions of the continent participated. In addition, over 200 studies from 28 African countries were reviewed. The final report brings together an unparalleled amount of information on the use and effects of neonics in Africa and flags many priorities for follow-up action by policy makers and the scientific community.

The evidence indicates that all African countries are using neonics. There is widespread neonic contamination of honey and pollen, and neonic residues have been found in the few studies conducted on soils and water bodies. We found no reason to expect that neonicotinoids' adverse side effects on non-target organisms such as pollinators should be any different in Africa than in Europe. Honeybee populations appear to be in general decline, as are other species including edible insects as well as insectivorous birds, although work to assign causative factors to these trends has not been conducted. Resistance is emerging in some vegetable pests where neonics are routinely used. In commercial cocoa plantations that use neonics to control mirid bugs, the natural pollination of cocoa flowers was strongly reduced and expensive manual alternatives had to be introduced.

Historical legacies mean that African countries rely on different sources for their data

Our report concluded that scientists and policy makers should urgently consider the implications of the widespread use of neonics on the sustainability of African agriculture. But this is easier said than done across so many countries, with their huge diversity of languages, culture, environments and crops. Existing regulatory systems are often weak and outdated, and rely on manufacturer submissions and regulatory data from developed countries for approval decisions. Historical legacies mean that countries rely on different sources for their data: Francophone countries tend to pay more attention to French law's stricter bans on neonicotinoids and strong protection of biodiversity than do Anglophone countries. But even if restrictions were applied uniformly along EU lines, enforcement is often lacking and counterfeit and illegal pesticides are not uncommon. Addressing these challenges will require dedicated regional and pan-African efforts to develop and unify regulations, and to develop effective mechanisms of enforcement.

One key to tackling these problems lies in independent agricultural advisory services. In many African countries, such services are provided by industry associations, which brings risks of bias in the advice dispensed to farmers. Instead of relying on (often prophylactic) application of pesticides, it is vital to promote integrated pest management (IPM), where pesticides are only applied when hygiene, physical methods and indigenous technical knowledge have not prevented a pest from exceeding a damaging threshold population. IPM offers farmers the opportunity to reap the benefits of ecosystem services provided for free by beneficial insects and other organisms. It also delivers sustainable agriculture, which is critical to the continent's food security and maintains agriculture's contribution to Africa's rural

communities and national economies. Promoting and supporting IPM should thus be a priority not only for advisory services and national governments, but also for development aid agencies. There are also lessons that regulators in developed countries need to learn. Pesticide evaluations need to be reformed to better assess low-level and accumulative toxic effects and potential to damage ecosystem services; despite this, insecticides with a very similar neuroactive function to neonics have recently been approved for use. Even though opposition can be expected from industry, regulatory authorities urgently need to introduce more effective criteria that are consistent with sustainable synergy between agriculture and ecosystem services – and lessons shared with African nations.

Source: © Damien Meyer/AFP/Getty Images
Bees are one of the beneficial organismsharmed by neonics

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The Unscrupulous Business of Bee Removals

Kai Hichert, Chairperson Southerns Beekeeping Association, Johannesburg

It`s that time of year again, mid-August, and as you step outside all your senses tell you that Spring is on the way. The weather is warming up, the flower buds are showing on the trees, the smell of rain is in the air and even the birds are chirping away. Then you hear it……. the unmistakable, intimidating buzz of a swarm of bees that is on the move. All normal people will run for cover believing they are going to be stung to death and are looking for the nearest swimming pool to jump in, which won`t work anyway. However, an experienced beekeeper knows this sound too well and knows that the bee swarming season has started in the scutellata areas, specifically in the Gauteng.

As winter comes to an end the colony will also notice the changes in the weather, just as we do, and will want to start increasing it's size. The current hive will be crammed with whatever honey is left over and a lot of dried up old honeycomb, the old home is not good enough for the season to come. The worker bees will ensure that the Queen lays an egg in a queen cell and worker scout bees will be out looking for a better new home. Swarming preparations have started, and nothing is going to stop it now. Before the virgin queen hatches, within 16 days, the existing Queen and majority of the worker bees will leave the hive. They might be guided directly to the new home that the scout bees have found, or they might just be in transit for a day or two and clump somewhere till they find appropriate new premises. Some of these new premises can be remarkably interesting and highly creative as some of the seasoned Bee Removers can attest to.

Johannesburg and Pretoria have between 17 to 22 wild bee swarms per square kilometer. Each one of these swarms will split numerous times in the season, up to 4 to 5 times. This is where the unscrupulous beekeeper`s senses go into overdrive. They hear the buzz of the bees and they know it`s going to be easy money now, from September through to December. Individuals, who are terrified of bees, realize that a swarm of bees has moved into their roof and are quick to turn to Google to look for a bee remover. From here numerous scenarios occur:

1. The individual is totally ignorant of the bee situation in the country, and the world for that matter, and goes with the cheapest and fastest "Remover." This will result in a worker arriving during the day and telling Joe that they use an essential oil spray to chase out the bees. Actually, they use termite poison and that is the end of the colony. A fast R750 is put in their pocket for 10 minutes of work.
2. The individual has heard that we must ensure the survival of the bees and looks at Google again. Now she sees there are "Removers" that "Never Kill Bees" and "Always save the bees." These companies are registered with DALRRD and some are even members of SABIO. When she calls these companies, the following will result: Two workers arrive during the day, assure Joe that they are doing a "humane" bee removal and the bees are relocated or even "set free." The individual feels reassured and watches the workers through her bedroom window removing the swarm from the roof. They work fast by pulling all the brood, honey, and bees out and putting everything in 20 liter buckets. With little regard to preserving the brood or keeping it separate they pile everything on top of everything else. The brood is crumpled and covered in honey. The bees are drowning in honey and as much as the workers assure the person that they "have the Queen" and the "bees will be relocated into a hive at their premises." The workers couldn`t care less! With no catch box or beehive in sight the workers will load the buckets into the back of their pick-up. The windows of the canopy and the lid of the buckets are left open. By the time they arrive at their premises the bees that could still crawl out of the bucket and fly out are now spread all over Johannesburg and become bird food. There is nothing left of the colony and nothing to re-hive or relocate. Another bee colony destroyed!
3. The individual checks with the bee associations and contacts a beekeeper who specializes in bee removals. The first question to the beekeeper is, why so much more expensive? The cost involved with doing a proper bee removal is more, as the beekeeper has to buy a beehive or catch box to re-hive the bees. Normally the work is done late afternoon and into the night. Lots of removers use Bee Vacs and spend substantially more time placing the brood onto frames and collecting all the bees, including the queen. If it is late in the season, the beekeeper will feed the swarm to ensure it survives during winter.

So how do we eliminate the unscrupulous bee removal companies and beekeepers? Often these companies are run by managers who are not even beekeepers. However, they do know how to sweet talk the public and convince them that they NEVER kill bees. At

present there is no legislation that protects bees against bad bee removal practices. There is legislation in place if the bees are killed with poison. A prosecutable case can be opened against them through DALRRD.

The only solution at present, before we can get legislation, is to Self-Regulate. SABIO has started by getting a small group of professional bee removers to establish a set of criteria to guide doing ethical bee removals. We realize that there are various methods for doing these removals. Day or night, bee vac or no bee vac, etc. Once the basic criteria have been set, a workshop will be arranged to discuss the proposals. ALL the bee removal companies and individuals will be invited, good and bad. Here everybody will be able to present their methods and discuss whether the colony to be removed will have a good chance of surviving the removal method.

SABIO gets numerous requests from removers to advertise on the web site. Who should be allowed to advertise? The best method to get ethical removers and self-regulate is to establish credibility. This can be done by:

1. Being registered with DALRRD
2. Being a SABIO Member
3. Being a Member of an Association
4. Carry liability insurance
5. Have done a bee removal course and have been mentored by an experienced bee remover
6. Be an existing, CREDIBLE bee remover with references and/or proper motivations and methods.

If a complaint is reported, then SABIO and the Associations can follow up with the relevant bee remover and corrective measures can be taken.

An Ethical Bee Removal Group has already been started in Gauteng and will be replicated throughout the country over time as well as the workshops.

What can we do if we are caring beekeepers but not bee removers to assist with the elimination of irresponsible bee removers?

EDUCATE THE PUBLIC! About how it should be done and how not.

Fig. 9 An example of ethical removal of a honey bee colony that will be rehived.

KNYSNA BEES NORMAL AGAIN (after 2017 fires)

Owen Williams, beekeeper – Kynsna

Three years after the devastation of 2017 Knysna fires, the beekeeping fraternity is looking forward to the 2020/21 honey harvesting season, which by all signs appears to have the potential to be the best in a decade.

Rains have been good, forage has recovered, and so too, the Cape honey bee populations in this vast area.

The beekeepers too, have completely recovered and some have grown their operations substantially.

One must doubt whether such recovery of the bees and their beekeepers would have occurred, were it not for the human intervention at that time of unprecedented devastation.

So on this third summer anniversary when we survey our beautifully recovered beekeeping environment, we reflect with gratitude, on the help that was provided to 55 beekeepers by:
Dr Imtiaz Sooliman and The Gift of the Givers, Guy McGladdery of McGladdery's beekeeping in Pietermaritzburg, Colin Campbell, the chairman of KBA, The SA Association in Hong Kong. In addition, those who gave up valuable time, despite their own losses, to operate the temporary aid stations:
Rog and Glynis Evins, Karin and Andrew Yates, Judy Harrison, Grant Livesey and Stephanus Oelf.
This was a truly an unprecedented relief programme in the world of beekeeping.
Again and on behalf of all recipients of aid, we thank you.

As time passes and the beekeepers of Knysna and the Garden Route return normal beekeeping activities, they face the same challenges as our beekeeping brothers and sisters elsewhere in SA. These include vandalism, theft, hive dumping, influx of more beekeepers and continued ignorant culling of eucalypts BUT if we all stand together and work together like our little honey bees and as we all did after the 2017 fires, we can only succeed, going forward.

Fig. 10 A survivor of the Knysna fires showing strong recovery. (Photo credit; Owen Williams)

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THE HONEY SHOW
AND THE HONEY JUDGE'S GUILD (HJG)

Natasha Lyon

This year will go down in history as one of the most extraordinary and unpredictable years with the outbreak of Covid-19. In time, history will also remember those that simply marched on and made the best of a difficult situation. This is true for our Beekeeping Industry as it continued to work hard looking after its buzzing ladies. In fact, the world over it is believed that Mother Nature had a chance to 'breathe' and rejuvenate her soul somewhat.

In 2018 a decision was taken by SABIO to resurrect honey competitions in South Africa and so The Honey Judge's Guild (HJG)was formed. Since then a hand full of volunteers, have grown into a group of 14 members including judges and stewards. Steward training has commenced under the wonderful mentorship of Chairman Eddy Lear, previous Vice Chairman Tina Lear and Chief Steward Lynne Hepplestone. The team continues to be very busy as they set out to encourage and invite beekeepers from across South Arica to enter their honey bee produce for future competitions.

Since its inception, the HJG has judged a total of 7 competitions, ending 2020 off with a National Honey Competition which was judged and then staged on 28 November. Both the competition and SABIO AGM was generously hosted by Eddy and Tina Lear at their conference facilities in Eikenhof, South of Johannesburg. This competition attracted over 150 entries, with around 400 exhibits. We were bowled over by the volume of entries and the judges were suitably impressed with the high standard of entries. The HJG would like to thank every single person who entered and would like to congratulate the prize winners, some of them entering a competition for the first time. This is a wonderful encouragement to all beekeepers to keep aside some of your special harvests for the next competition. Competition details and dates will be communicated via the various beekeeping associations across South Africa and will also be posted on the HJG link on the SABIO website www.sabio.org.za.

A POINT TO PONDER

According to SANBI, South Africa has nearly 22,000 plant species which represents almost 8% of all the plant species in the world. It is therefore no wonder that we have some of the most amazing and complex honeys in the world. This botanical and geographical footprint is expressed in all our amazing honey bee produce and the competitions give you and your buzzing ladies a time to shine. Categories include photography, creamed honey, granulated honey, chunk honey, honey comb, liquid honey, bees wax, mead, frame of honey and speciality category amongst others.

ABOUT THE HONEY JUDGE'S GUILD

Although affiliated with SABIO, the Honey Judge's Guild is apolitical, unbiased and must have organizational independence (freedom from conditions that threaten the ability of the HJG to carry out their responsibilities in line with the HJG Code of Ethics). Thus, it is important that the HJG must not feel any pressure or interference from any members. Herein lies the credibility, professionalism and ethical service which the HJG offers to the beekeeping industry.

INTRODUCING THE JUDGES

Arie Dercksen – Mead Judge

Arie holds a Masters Degree in Technology & Biochemistry. He obtained his Mead Master Qualification in 2000 and started making mead in 1984. Eddy Lear and Arie started working together in 1991 when Eddy needed to have mead legalised. Arie worked for South African Breweries for 23 years and retired as a Flavour Research Scientist in 2003. Today Arie still performs a range of sensory and molecular analyses for the flavour and fragrance industries.

Reg Morgan – Honey Judge

Reg has been a beekeeper since 1982 and was part of Natal Bee Farmers Association where he was responsible for the Honey Section at the Royal Show. From the very beginning Reg was fascinated by South Africa's amazing honey varietals and colours and so he started entering his honeys into competitions. After many years of entering he became intrigued by the judging process and got involved in judging where he was mentored by Reg Leverage. Reg has served the industry as a Honey Judge since the mid 1990's and brings many years of skill and experience to the judging panel.

Eddy Lear – Apimondia Accredited, International Honey Judge

Eddy has been keeping bees since 1981 and started making mead in 1990. He was stewarding at the Rand Show and became Chairman for the Show Committee during his time as Chief Steward. In 1997 Eddy entered the Rand Easter Show as a learner Judge under international Judge Raymond Borneck a French beekeeper and chair of their beekeeping federation. Raymond nominated Eddy as an international Judge, and he was invited to participate as a Judge at the 1997 Apimondia Congress in Antwerp and again in 2001 at the Apimondia Congress in Durban. In 2007 Eddy was requested to judge both honey and mead at the BEECON held in Broederstroom. Eddy also oversaw the competition at BEECON in 2019 as Chief Judge.

Mead - Eddy was instrumental in the legalisation of Mead in South Africa in 1993. He also formed SAMMA that put together industry standards and regulations for mead (published in 1996). Mead making is one of his passions as he continues to create interesting meads whilst guiding and inspiring his fellow beekeepers.

Tina Lear – Honey Judge

Tina competed in competitions and won prizes in various categories. In the late 1980's she was invited as a steward where she completed her training alongside the Judges. Tina became the first woman to be elected as Chief Steward. Her passion for education was evident from the start as she would interact and educate the public on the value of Honey. Between 1999-2000, Tina served as Chairman of the Apiarian Section, Chief Steward and Paid Steward. She represented the Apiarian Section as the Vice President of the Witwatersrand Agricultural Society.

In 2001, Primedia requested Tina to organize the Apiarian section at the annual Agricultural Youth Show. She invited a few Primary schools to enter Bee Art posters and Bee mobiles for the show. One of her highlights was to see the children receive their prizes and medals. Today Tina is an accredited Judge and served as a Judge at the following competitions; Notherns Beekeeping Association, Eastern Highveld Beekeeping Association, SABIO BEECON 2019, Rustenburg Honey Festival and hosted and served as a honey judge at the National Honey Judge Guild Competition November 2020.

SABIO and the beekeeping community at large, thank Eddy, Tina, Arie, Reg, Lynne and their wonderful team who gave so generously of their time, away from family and work responsibilities, in order to serve the industry by growing honey competitions in South Africa.

SABIO Chairman – Adriaan du Toit

SABIO Board Members, Honey Competition – Inge Lotter, Kai Hitchert

HONEY JUDGE'S GUILD (HJG) Judges – Eddy Lear, Tina Lear, Reg Morgan, Arie Dercksen (Mead)

HONEY JUDGE'S GUILD (HJG) STEWARDS – Lynne Hepplestone (Chief Steward), Rory Hansel, Matthew Hansel, Sisiphiwo Dingana, Tessa Hughes, Natasha Lyon, Simthembile Nzuzo, Elize Lundall-Magnuson, Mems Ramaila, Daniel Bridger,

Honey judges beginning ready to start their tasting. From left to right -Eddy Lear, Arie Dercksen, Tina Lear, and Reg Morgan.

Judges and stewards preparing to start the process of judging

After a hard day's work we had dinner together.

Meet the team: Eddy Lear (Judge), Tina Lear (Judge), Simthembile Nzuzo, Reg Morgan (Judge), Sisiphiwo Dingana, Arie Dercksen (Mead Judge), Rory Handsel, Elize Lundell-Magnuson, Lynne Hepplestone, Linda de Chalain and Natasha Lyon. Missing: Hannelie Human

HONEY JUDGES' GUILD
OF SOUTH AFRICA

The Honey Judges Guild National Honey competition

25-27 November 2020.

Results of the Competition in 2020

Hannelie Human

OPEN CLASS 1

1.1 Liquid Honey Light

1st Philip du Toit 96%
2nd Elizabeth Lamond 95.5%
3rd Karen Dunn (Urban Apiary) 95%

Highly commended
Hans Steenpoorte 94%
Daniel Bridger 94%

1.2 Liquid Honey Medium

1st Louis Van Zyl 97%
2nd Kai Hichert 96.5%
3rd Georges Lenferna 94%

Highly commended
Sandra Hughes 93%

1.3 Liquid Honey Dark

1st Sandra Hughes 97.5%
2nd Natasha Lyon 95.5%
3rd Abram Setshasi 94%

CLASS 2

Select Liquid Honey

Orange Blossom
1st Daniel Bridger *100%*
2nd Hans Steenpoorte 92%
3rd Louis Van Zyl 91%/
3rd David Baxter 91%

Swarthaak
1st Rory Hansel 91%
2nd AngloPlats 90.5%
3rd Gabathatha Matshediso 90%

Macadamia
1st Louis Van Zyl 96.5%
2nd Kristie Paine 95.5%
3rd Philip du Toit 95%

Black Iron Bark
1st Georges Lenferna 94%

Novice Liquid Light

1st Elize Lundall-Magnuson 93.5%

CLASS 3

3.1 Granulated Honey Light

1st Philip du Toit 95%

3.2 Granulated Honey Medium

1st Hans Steenpoorte 99%
2nd Hans Steenpoorte 97%

CLASS 4

Creamed honey

1st Philip du Toit 98.5%
2nd Louis Van Zyl 95%
3rd Louis Van Zyl 90.5

Novice Honey

1st Kristie Paine 95%

CLASS 5

Chunk Honey

1st Karen Dunn (Urban Apiary) 96.3%

CLASS 6

6.1 Comb Honey

1st Hans Steenpoorte 98.75%
2nd Hans Steenpoorte 98.5%
3rd Mike Miles 95.5%

6.2 Frames

1st Karen Dunn (Urban Apiary) 94.9%
2nd Herman Steyn 94.43%
3rd Karen Dunn (Urban Apiary) 94.17%

CLASS 9

Dry Mead

1st Eddy Lear 92%

CLASS 10

Semi-sweet Mead

1st Eddy Lear 98%

CLASS 11

Sweet Mead

1st Eddy Lear *100%*
2nd Eddy Lear 97%

CLASS 12

Metheglyn (Mead)

1st Mike Miles 93%
2nd Eddy Lear 92%

CLASS 13

Melomel (Mead)

1st Jason Scriven *100%*
2nd Jason Scriven 91%

CLASS 15

Honey Beer

1st David Baxter 97%

CLASS 7

Wax Blocks- Light

1st Inge Lotter 99.5%
2nd Inge Lotter 98.75%

Wax Blocks- Medium

1st Inge Lotter 93.75%
2nd Georges Lenferna 93.25%

Pollination Specialists

Company Registration 2018/225546/07

POLLINATION

Advise - Training - Inspections

Philip du Toit
083 401 1116

Adriaan du Toit
083 306 1446

Dept. of Agriculture, Land Reform and Rural Development (DALRRD)

CONTACTSFOR BEEKEEPING

Mr Riaan van Zyl and Mr Kobus Kemp are the persons who beekeepers should contact if they have any suspicion about bee diseases or the presence thereof such as AFB and the Capensis clones.

They can also be contacted regarding legislation concerning honey labelling and the standards of import requirements of honey.

They do not provide advice on beekeeping practises, but will if possible direct persons with enquiries to the correct or experienced sources.

PLEASE CONTACTTHEM:

Riaan van Zyl: (Capensis)
Tel: 021 809 1702
Cell: 083 4142494
Email: riaanvz@dalrrd.gov.za

Kobus Kemp: (Scutellata)
Tel: 012 309 8762
Cell: 082 873 1678
Email: kobusk@ dalrrd.gov.za

IH WIESE AWARD

Dr Bing Wiese was the Director of the Agriculture Research Council's Plant Protection Research Institute (PPRI) or almost thirty years. With his interest in beekeeping, the PPRI became the official "home" of beekeeping. During this time, Dr Wiese fostered bee research capacity in South Africa and established the Apicultural Advisory Committee, to coordinate bee research in South Africa. He served as Patron of The South African Bee Federation, the forerunner of SABIO. The Dr Wiese award was instituted by the SAFBA to recognize technical contributions to beekeeping practise and has only been presented twice. First to Dr Adriaan du Toit in 1999 for establishing a practical methodology to calculate sufficient pollinator numbers on row crops during seed production (sunflower, onions and carrots) which is still used today. The second recipient was Mr Sidwell Banne in 2007 in recognition of his coaching and mentoring of development beekeepers throughout South Africa.

Dr Hannelie Human was honoured at the SABIO AGM on 5 December 2020 with the Dr I.H. (Bing) Wiese award for her outstanding technical contribution to beekeeping in South Africa. This award was made by the SABIO Chairman in recognition of Hannelie's work during the COVID-19 lockdown period. She kept the SABIO Board up to date on local as well as international developments concerning COVID-19 and its potential impact on local beekeeping activities by following the pandemic unfolding in the international beekeeping environment. Hannelie was responsible for developing the SABIO website page on COVID-19 and instrumental in drafting the South African Beekeeping Covid-19 Code of Practice for beekeepers to follow when working bees. She kept in contact with Apimondia officials and country members as well as FAO in reporting and providing survey feedback on our unique circumstances in South Africa. Using this information and in particular producing the Beekeeping Covid-19 Code of Practice enabled SABIO to approach DALLRD with a proposed a bee movement permit system. This proposal was accepted by the Department. South Africa was one of a few countries where controlled beekeeping practices were able to continue during a full level 5 Covid-19 lockdown period as well as during times of a curfew. The South African bee movement permit system received international recognition from Apimondia as well as the FAO. Hannelie is well-known in the local and international bee research environment and has published more than 30 peer- reviewed research papers, 35 popular research articles and contributed to 4 book chapters on honeybees.

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Privaatsak X206 Delmas 2210

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Fax. 013 665 1761
Cell. 082 777 0004
Email. admin@vanderlaan.co.za

SABIO acts as sole agent for the marketing of a special group insurance policy for its members with Van der Laan Insurance Brokers cc which was specifically designed and negotiated for the Beekeeping Community

An important rule in beekeeping liability insurance is that you must never admit guilt or give any indication that your bees were liable for any damage caused. So thus if you experience any problems where you are accused by a third party of injuries or damages or damages attributed to your bees or bee-related actions you need to contact the broker and they will handle the claim. Thus with relatively little money for insurance you buy greater peace of mind. When animals die or a bush fire starts due to beekeeping activities it is bad, but it is far worse if people loose their lives due to aggressive bee activity. This policy does not cover individual hive losses due to fires, flood damage, theft or collapse of colonies or any other personal losses. It is public liability insurance.

Only SABIO members can apply for this policy

FSP: 8115

CONTACT DETAILS

NATIONAL ASSOCIATION

SABIO: South African Bee Industry Organisation
Chairman: Adriaan du Toit, Pretoria, Gauteng
Cell: 083 306 1446 * Email: info@sabio.org.za * Web Address: https://www.sabio.org.za/

REGIONAL / LOCAL ASSOCIATIONS & INTEREST GROUPS

Eastern Highveld Beekeepers' Association
Chairman: Capie du Toit * East Rand, Gauteng
Cell: 072 368 0476 * Email: capiedutoit@denel.co.za

Eastern Cape Development Beekeepers
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Knysna Beekeepers' Association
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KwaZulu-Natal Bee Farmers' Association
Chairman: Phil Walker * Pietermaritzburg, KwaZulu- Natal
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Mpumalanga Beekeeping Interest Group
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Northern Cape Bee Interest Group
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Northerns Beekeepers' Association
Chairman: Jan Steenkamp* Cell: 076 061 3700
Communications: Riekie van den Berg * Pretoria, Gauteng
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Eastern Cape Interest Group
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Southern Cape Bee Industry Association
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Co- ordinator: Hannes van Zyl * George, Southern Cape
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Southerns Beekeeping Association
Chairman: Kai Hichert * Johannesburg, Gauteng
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Western Cape Bee Industry Association
Chairman: Tlou Masehela * Cape Town, Western Cape
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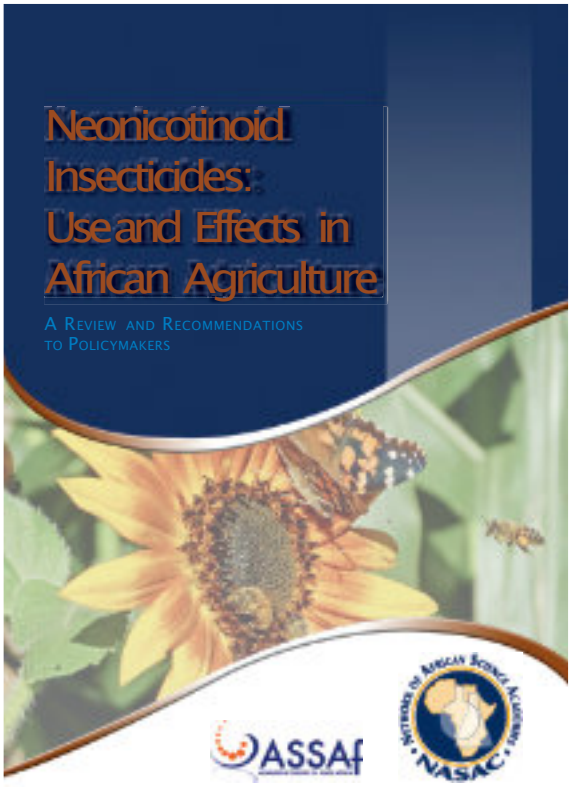
INTERNET FORUMS

BeesSA Email Discussion Group
Moderator: Robert Post * Joostenbergvlakte, Boland, Western Cape
Tel: 021 971 1022 * Email: crpost@telkomsa.net

Apiculture SA Email Discussion Group
Moderator: Dean Lennox * Cape Town, Western Cape
Email: deanlennox@gmail.com
Web Address: http://groups.google.com.co.za/group/apiculture-sa

Published Material of Interest



https://nasaconline.org/en/index.php/202/05/26/neonicotinoid-insecticides-use-and-effects-in-african-agriculture-a-review-and-recommendations-to-policy-makers/

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RESEARCH ARTICLE

Drinking made easier: honey bee tongues dip faster into warmer and/orless viscous artificial nectar

Lianhui Shi[1,2], Susan W. Nicolson[3], Yunqiang Yang[2], Jianing Wu[1,*], Shaoze Yan[4] and Zhigang Wu[1]

ABSTRACT

Optimal concentrations for nectar drinking are limited by the steep increase in the viscosity of sugar solutions with concentration. However, nectar viscosity is inversely related to temperature, which suggests there are advantages to foraging from flowers that are warmer than the surrounding air. The honey bee (Apis mellifera L.) dips nectar using a hairy tongue. However, the microscopic dynamics of the tongue while the bee ingests nectar of varying concentration, viscosity and temperature are unknown. In this study, we found that honey bees respond to the variation of nectar properties by regulating dipping frequency. Through high-speed imaging, we discovered that the honey bee traps warmer sucrose solutions with a quicker tongue. The honey bee dips the warmest and most dilute solution (40°C and 25% w/wsucrose) 1.57 times as fast as the coldest and thickest solution (20°C and 45% w/w sucrose). When the viscosity of different sucrose concentrations was kept constant by adding the inert polysaccharide Tylose, honey bees dipped nectar at constant frequency. We propose a fluid mechanism model to elucidate potential effects on sucrose intake and show that higher dipping frequency can increase the volumetric and energetic intake rates by 125% and 15%, respectively. Our findings broaden insights into how honey bees adapt to foraging constraints from the perspective of tongue dynamics, and demonstrate that elevated intrafloral temperatures and lower nectar viscosity can improve the volumetric and energetic intake rates of pollinators.

KEY WORDS: Pollinator, Apis mellifera, Temperature, Viscosity, Dipping frequency

INTRODUCTION

The optimal nectar concentrations for pollinators of different functional groups have been a source of much interest to pollination biologists, with one of the best known examples being the contrast between the dilute nectars of bird-pollinated flowers and the more concentrated nectars of bee-pollinated flowers (Pyke and Waser, 1981). Studies on the fluid mechanics of drinking show that optimal concentrations depend on the drinking mechanism used (Heyneman, 1983; Kim et al., 2011; Kim and Bush, 2012); this may be active suction in butterflies, capillary suction in nectar-feeding birds, or viscous dipping in most bees and in bats (Kim et al., 2011). Because viscosity increases sharply with sugar concentration, animals employing these different techniques have different optimal nectar concentrations.

The honey bee is arguably the most important pollinator worldwide, and its mouthparts and drinking strategies have been studied extensively (Goodman, 2003; Krenn et al., 2005; Wu et al., 2019). The mouthparts include paired galeae and labial palps which enclose a segmented glossa covered by long, distally pointing hairs, also known as microtrichia (Fig. S1). When the glossa is extended into nectar, the hairs snap outward, remaining erect as the bee withdraws its tongue, so that they play an important role in trapping nectar. At the end of each dipping cycle, the hairs flatten as nectar is taken into the food canal (Zhu et al., 2016; Yang et al., 2017). Combined experimental observation and mathematical modelling demonstrated that this specialized viscous-dipping technique can meet the contradicting demands of both high sugar intake and low energy consumption (Wu et al., 2015, 2018). Our previous work revealed that the dipping frequency can be employed to characterize functional adaptation in honey bees, such as the compensation in nectar intake rate induced by structure deterioration: older honey bees with shorter glossal hairs dip nectar faster (Wu et al., 2019).

While the energy content of nectar increases linearly with sugar concentration, its viscosity increases exponentially; in addition, the viscosity of a sucrose solution decreases, although less steeply, with increased temperature (Pieter, 1953; Heyneman, 1983; Nicolson and Thornburg, 2007; Telis et al., 2007). Nicolson et al. (2013) offered artificial nectar of different temperatures and viscosities to honey bees in a natural setting, finding that both parameters affected the crop loads of individual bees and the consumption of sucrose solutions by colonies. These preferences of honey bees for warmer and less viscous nectar may facilitate reduced thermoregulatory costs and faster ingestion times (Nicolson et al., 2013). Extensive studies have reported effects of nectar viscosity on volumetric intake rate among a variety of insect species (Kingsolver and Daniel, 1983; May, 1985; Josens and Farina, 2001; Borrell, 2006; Kim et al., 2011; Yang et al., 2014); however, intrinsic connections among nectar temperature, nectar viscosity and dipping frequency remain unexplored. In this paper, we quantified the dipping frequency using high-speed imaging techniques while feeding honey bees artificial nectars of varying temperatures and concentrations, or with viscosity adjusted using the inert polysaccharide Tylose. Then, we built a mathematical model to analyse the key parameters that determine the nectar intake rate and energy reward. We predicted that temperature and viscosity effects on dipping frequency can enhance both volumetric and energetic intake rates, which may be one reason why bees are attracted to warm flowers (Dyer et al., 2006; Kovac and Stabentheiner, 2011).

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PLOS ONE

RESEARCH ARTICLE

Impacts of neonicotinoid seed treatments on soil-dwellingpest populations and agronomic parameters in corn and soybean in Quebec (Canada)

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Abstract

Agricultural soil pests, including wireworms (Coleoptera: Elateridae), are managed primarily with pesticides applied directly to seeds before sowing. Seeds coated with neonicotinoids have been used widely in Quebec (Canada) for several years. To assess the agronomic and economic value of neonicotinoid seed treatments in soybeans and corn in Quebec, trials were conducted from 2012 to 2016 in 84 fields across seven regions in Quebec. We evaluated the effect of neonicotinoid seed treatments on soil pest densities, crop damage and yield. The results showed that 92.6% of corn fields and 69.0% of soybean fields had less than 1 wireworm per bait trap. However, no significant differences in plant stand or yield were observed between treated and untreated corn or soybeans during the study. This study shows that neonicotinoid seed treatments in field crops in Quebec are useful in less than 5% of cases, given the very low level of pest-associated pressure and damage, and that they should not be used prophylactically. Integrated pest management (IPM) strategies need to be developed for soil insect pests to offer effective alternative solutions to producers.

Introduction

Since the middle of the 1990s, neonicotinoids (i.e. imidacloprid, clothianidin and thiamethoxam) have become the main class of insecticides routinely used to protect seeds and seedlings against injuries caused by soil insects [1, 2, 3]. Corn, canola, soybeans, wheat and cotton are the principal crops grown worldwide for which seed treatments are used on a large scale, with a rapid increase in the acreages treated [1, 4]. A vast body of scientific literature has demonstrated that the scale of use of those insecticides has resulted in widespread contamination of agricultural soils, freshwater resources, wetlands, and non-target vegetation, along with

OPEN ACCESS

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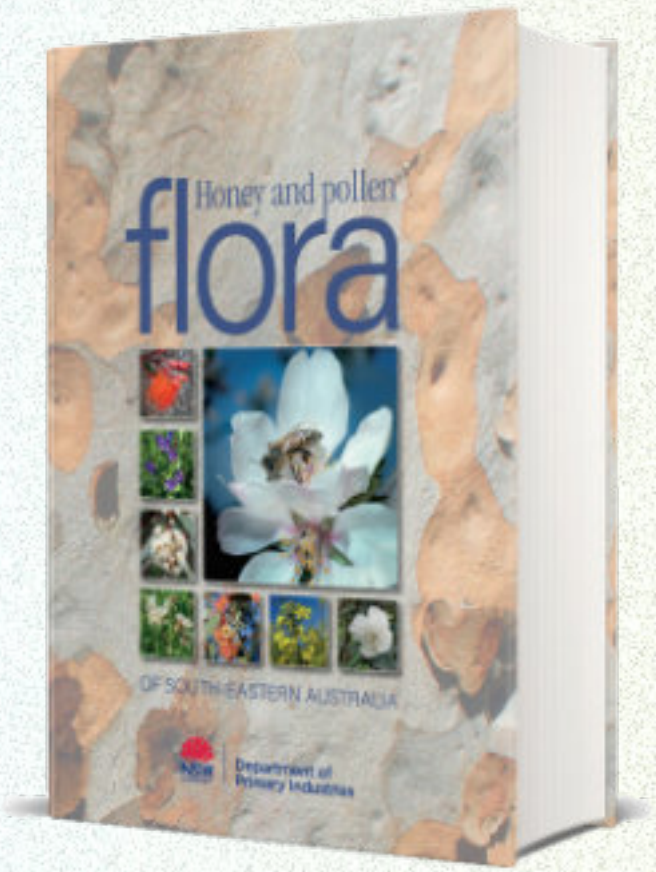


Publication details

Author: Dr Doug Somerville
ISBN: 9781760583422 | 680 pages
Catalogue number: B982
Publisher: NSW Department of Primary Industries | 2019

Description
Understanding the biology of flora and its value to honey bees is core knowledge for successful beekeeping. Bees feed on nectar and pollen. No food equals no bees!

Beekeepers need to know the floral resources around them, and the nutritional value of those resources to bees, to keep their bee colonies healthy.

This publication focuses on the value of plants to nectarivores, and honey bees in particular. The result of over 30 years of research, it distills both scientific knowledge and the opinions of hundreds of beekeepers into a reference work that will be the cornerstone of floral understanding in apiculture in Australia for years to come.

A Personal Review – *The Dark Side of the Hive – The Evolution of the Imperfect Honey Bee.*

By: Robin Crewe and Robin Moritz.
Oxford Press 2018 – ISBN 9780190872281.

John Moodie, Honeywood Farm, Swellendam, South Africa.

Part 1

My work as a beekeeper started as a child, teaching came later. As a teacher I generally assess non- fiction books on the basis of how they contribute to the overall content of what I consider to be essential to a course – be it literature, history, education or beekeeping. There are certain books that simply may not be omitted from a list of prescribed books. For example, no student could study communism without reading Karl Marx's Communist Manifesto. I would like to say, with absolute certainty, that The Dark Side of the Hive, albeit no Communist Manifesto, is a book that no complete list of prescribed reading for a course on beekeeping should exclude.

I remember my Grandmother once saying that she was looking forward to reaching heaven because all the questions she had about nature and life would be answered. My brother – who later became a professor of sociology – replied that he felt heaven would then become a boring place, because without questions and the struggle to find answers – existence would be a dull affair. The very essence of science and learning is the unfolding of answers around good questions. Perhaps that is why I enjoyed The Dark Side of the Hive so much. Robin and Robin tackle questions that all beekeepers have asked themselves about the insects they work with and observe daily. Their questions and best answers are by no means the final word. They do, however, provide an excellent foil to recent research and many held assumptions about bees, giving the reader real insight into their own world view, as well as challenging historical and contemporary research on bees. This is clearly spelt out in the introduction to their treatise, where contemporary research is acknowledged, but not accepted as the definitive answer to honeybee eusocial behaviour.

When approached about doing a review it was suggested that I attempt a summary of the book instead of a review, but I felt that, because nothing can replace a reading of a book, I decided to do a fairly comprehensive review of the book in two parts dealing with it Chapter by Chapter, highlighting the questions and answers offered in those chapters. By doing so, I hope to encourage you to read the book and draw your own

conclusions.

My selection of themes from each chapter is a personal one – I am sure others will find different areas of interest in their comprehensive reading of the book.

We all have had the hope that honey bees, like man, originated in Africa. This appears not to be the case. In spite of limited paleontological evidence the Middle East remains the original source. The distinction made between *Apis* which are open nesting and those with cavity nests, makes an easily grasped distinction of the two main categories of *Apis*. The fact that *Apis* makes up only 1.3% of all bee species, shows how few species of honey bees actually exist and therefore what the impact would be, if one species were to become extinct. Solitary bees abound in variety. *Apis,* rather like humans, have large populations and many sub-species and have become the dominant pollinators and honey providers for Man. This discussion you find in Chap 2 – Out of the Dark.

Chapter 3 talks about the basic bee diet - typically vegan - all the more ironic as vegans do not eat honey! The 'difficult diet' is that both nectar and pollen from flowers has an extremely limited life span with any nutritional value. Nectar will ferment and pollen loses its food value in an extremely short span of time. Without a fridge or stove how do the honey bees manage to work with these sticky, dusty substances? And how are they able to preserve it in their combs? They reduce the moisture content of nectar from 80% to 20% adding antibiotic components in hygienic conditions and make bee bread from pollen preserving it in their combs. In their combs – not neatly hexagonal, or designed by the bees but round with the final shape coming from the properties of wax! How they consume and use this food store is also explained. The question as to why they do not simply store this food for later consumption by emerging young is asked. Nurse bees continuously feed their larvae instead of just leaving the larvae to consume food stored for them. This readily absorbed nutrition speeds up the rate at which bees emerge by 7 days. Not a significant time difference for solitary bees but considering the number of eggs laid by the queen this can make a real difference to the rate of growth in the size of a colony to ensure its survival.

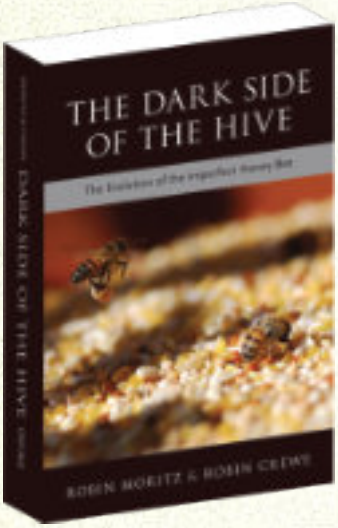
Chapter four deals with the fascinating chemistry of social recognition and tackles the endless debate about who controls what happens in the swarm. Many contemporary researchers have made this into a picture of harmonious coexistence. Honey bee behaviour is compared to human democracy with decision making processes to be emulated in human society. The chemistry of regulation depends more on non-volatile and not volatile pheromones. The queen substance is 9-ODA while that of the worker bee 10 HDA. There are conflicting chemical conundrums investigated. How does the queen use non-volatile sex attractants to attract males and then uses the same pheromone to control the workers? She remains the dominant female with 'sterilized' helpers in support.

How does the queen manage this? Chapter 5 is about the reproductive machine we refer to as the queen - for the sake of a better word. Firstly how, why and when is it decided to create a queen? What makes the difference to the outcome – concentrated sugars, royalactin or the pH of royal jelly? Once they hatch who decides who survives? A fecal component keeps the workers at bay, while the newly emerged young queens fight amongst themselves to determine who wins, so not the workers at this stage. Then on to mating – why don't drones mate in the hive? If the queen attracts the drone with queen pheromone in flight why don't they pounce on her once she returns to the hive, as she is still exuding the same pheromone when she comes home.

This just about takes me half way through the book. Still have worker bees, diseases, the Cape Bee, the future of the honeybees to cover in Part 2. All of these questions have the theme of evolution as a leitmotiv running through the answers. Why and how have honey bees evolved as they have? Frequently not in the smartest or most logical way, often defying what we would have thought to be the 'fittest' way.

All very well to talk about questions and academic answers. How did this book help me with my beekeeping in a practical sense? I have had a really terrible time this year getting my grafted larvae to take in the incubation hive. Normally this has not been a problem and I have had in the region of an 80% take, with almost too many queen cells to work with. This year was a disaster with only about a 10% take. Just empty queen cups. The only real difference this year was that I decided to use sterile water to mix with royal jelly on which to place the grafted larvae. I usually just used our beautiful mountain water with a pH of about 4.5 to 5. but decided to be clever and use the pre-packed sterile water. It was only after reading Chapter 5 about feeding queens that I realized that the reason I had failure, was because royal jelly needs a pH of as low as 4 in order to keep its viscosity and jelly like properties. My sterile water would have had a pH of 7 which is normal, and was simply causing the larvae to drop out of their cells. Without the information about royal jelly needing to be acid I would have been none the wiser.

Just one practical example of how useful knowledge is when it comes to farming with bees.



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