SABIO

The South African
Bee Journal
May 2020 • Volume 92 • No.1

COVID 19 LOCKDOWN IMPACTS LOCALLY & INTERNATIONALLY

APIMONDIA 2020 STATEMENT ON HONEY FRAUD

POLLINATION REQUIREMENTS

PERMITS FOR BEEKEEPING DURING LOCKDOWN

RECOMMENDED RETAIL PRICE: R40
ISSN 0038–2019
9 770038 201007

BEECON 2020

•POSTPONED•

STARKE AYRES®

Add some colour to your

Winter Garden

with our range of winter flowers

GUARANTEED QUALITY
NON-GMO

Kelpak is a plant growth regulator which will assist in strengthening stem cells during the cold winter days.

Kelpak (Reg No. L5756 Act 36 of 1947) Fertiliser Group 2 • Nutrisol (Reg No. K8591 Act 36 of 1947) Fertiliser Group 2 • Sea Secret (Reg No. B4319 Act 36 of 1947) Fertiliser Group 2

CUSTOMER SERVICES: 0860 782 753 • WWW.STARKEAYRES.CO.ZA • MEMBER OF THE PLENNEGY GROUP

SEEDS OF SUCCESS

The South African
Bee Journal
May 2020 • Volume 92 • No.1

EMAIL

SABJeditor@gmail.com

Layout and Design

Alastair Crewe
alastaircrewe@gmail.com

CONTACT

SABIO Website:
www.sabio.org.za

General Enquiries:
info@sabio.org.za

Membership, insurance and Administration:
admin@sabio.org.za

CONTENTS

Cover Images: Left: worker with deformed wing virus (DWV) Right: worker with acute bee paralysis virus (ABPV). **Picture Credit:** Per Kryger

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

"After covid-19, leaders will prepare institutions to prevent the next pandemic." Bill Gates, *Learning to fight the next pandemic*, The Economist, 23 April, 2020.

Unsurprisingly, this edition of the Journal is devoted largely to addressing the effects and potential effects of the COVID-19 pandemic on beekeepers and the beekeeping industry. The immediate effects have been documented at an international scale in the article by Raeffele Dall'Olio of Italy through the Food and Agricultural Organisation (FAO), while in another article we have provided some first hand responses from South Africa. The material in these articles deals with the immediate impact of the lockdown regulations on the activities necessary to have a thriving apicultural industry. What this commentary does not address, is the longer term impact on the economy of the commercial disruptions and the time scale over which recovery will take place. What is clear is that this period may provide a great opportunity for the development of local businesses in the apicultural field while international supply chains are disrupted. In addition, as the quotation from Bill Gates indicates leaders need to prepare their industries to deal with future shocks of a similar nature, so that future responses can be proposed at short notice. This is the challenge that leaders in the beekeeping industry need to confront immediately.

The local bee industry has struggled for many years to convince the participants in the industry to register and to support an industry wide organisation that will be able to lobby effectively on behalf of all of the participants. These initiatives have progressed in fits and starts for a period that spans almost a century. The registration of beekeepers has now become a reality with the passing of legislation making this a requirement, and with the issuing of registration certificates by the Department of Agriculture, Land Reform and Rural Development (DALRRD) which are now valid for a period of two years. Although the policing of registration may be deficient, there is still a legal obligation on all South Africa beekeepers to register. The various provincial Beekeepers Associations need to be at the forefront of ensuring that all who keep bees are registered and have a basic knowledge of honey bee biology and husbandry. Only by acting professionally can the beekeeping community ensure that the use of honey bees as a resource is sustainable into the future. The current human viral crisis has brought home to both local beekeepers and the global bee products industry, that the significance of bees to agricultural production and export revenue generation is not appreciated by regulatory authorities. Local beekeepers discovered that there is a vital need to be registered in order to continue with their beekeeping activities since a registration certificate is one of the documents that is required for beekeepers to show that they are part of an essential service that needs to be maintained in the interests of food security. It is ironic that it has taken a crisis of global proportions rather than self-interest to bring this message home to beekeepers and the industry.

Support for the industry-wide Beekeepers' organisation SABIO – needs to be strengthened and greater levels of cooperation between the provincial associations and SABIO achieved. The current crisis has stressed this system of co-operation and demonstrated that greater levels of mutual understanding need to be in place so that representations to external stakeholders such as government for regulations and services, farmers and agricultural industry for an understanding of their responsibilities for preserving honey bees from harm, can be managed effectively. This appears to emerging at the moment if this quotation from a member of an association is representative:

> "Agreed - well done SABIO team!!
> We can show our appreciation by paying our membership fees. Imagine the possibilities if we all work together. A super organism ...just like the bees. SABIO can be given much bigger wings if we all pay our membership fees and support our Queen Bee
> Just saying" - Natasha – Southerns Beekeeping Association

It is in everybody's interests to have an effective means of lobbying coherently for the industry and protecting the livelihoods of individuals.

The beekeeping industry should emerge from the current stressful time in such a way that it is significantly stronger for all participants.

R M Crewe

DO YOU WANT TO KEEP BEES?

JOIN THE SOUTHERNS BEEKEEPING ASSOCIATION

- Monthly meetings in Bryanston.
- Experienced beekeepers to advise you.
- Field trips for practical experience.
- Honey Competitions!

SBA

SOUTHERNS BEEKEEPING ASSOCIATION

www.beekeepers.co.za
info@beekeepers.co.za

@SouthernsBeekeepingAssociation (Facebook)

FROM THE CHAIR

As a country and, in particular as a bee industry, we all started 2020 with renewed energy and each of us with his or her own goals. A particular highlight was when the South African Tourism Industry's Conference Bureau hosted SABIO Board Members at the Meetings Africa event on Association Day, 24th February. The SABIO Delegation was joined by our esteemed international guests, Apimondia Board Member and President of the Bee Health Commission, Dr Fani Hatjina of Greece and Sweden Beekeepers Federation Board Member, Mr Leo De Geer.

The purpose of Meetings Africa was to showcase Africa's diverse offering of conference services providing a platform where African associations and the African conference industry professionals could form a partnership and help transform our Continent. Our international guests, Dr Fani Hatjina and Mr Leo de Geer, stayed on for a week where they learned about the conference industry in South Africa, visited Kai Hichert's beekeeping site in urban Johannesburg and then spent two days with Jaco Wolfaardt exploring the delights of Cape Town as a host city. All of this was part of SABIO's planned future activities in terms of hosting a Regional African Symposium in 2022 and ultimately bidding to host the Apimondia International Congress in 2027 in Cape Town. With this 'get-up-and-go' attitude, the SABIO Board travelled to Paarl for its Board meeting and the planning of our annual BEECON 2020 to be held in Stellenbosch during July 2020, unaware of the forthcoming challenges looming for the country and the bee industry alike.

Then, on 23rd March 2020, South Africans were hit with the reality of a pandemic when our President announced arrangements to be implemented by the Country to deal with COVID-19. The most drastic and 'taking-the-wind-out-of-our-sails' action was a nationwide 21-day lockdown starting on 26th March 2020 at midnight. In the next three days frantic discussions and deliberations took place at SABIO Board level as well as through interaction with the Associations. As Jan Steenkamp, Chairman of Northerns Bee Association said afterwards "we all had three days notification only, I had to move 2,000 beehives and with my team worked 22 hours a day to accomplish that, as I did not know whether I would be allowed to service or move those hives in the next 21 days". Lockdown legislation was only published on 25th March and the seriousness of the lockdown then started to became a reality. NO MOVEMENT of people and goods was allowed with only essential services to operate under STRICT CONTROLLED conditions.

As an industry role player, SABIO urged and encouraged its members to demonstrate discipline by firmly complying and adhering to health regulations to contain and stem COVID19 while supplying critical services to grower farmers, in particular to the fruit and seed industries. SABIO Members, as beekeepers, collectively provide an estimated 120,000 bee hive units for the successful pollination of fruit sets for various commercial crops. On the one hand we had reached the end of the sunflower pollination season and beehives had to be moved out of fields to facilitate harvesting of the crop, while for fruit crops the flowering season was upon us and pollination units had to be conditioned for the oncoming season.

SABIO as an industry body, together with support from its Associations and the University of Pretoria, put forward a motivation for the controlled movement and preparation of honey bee pollination units to the DALRRD for consideration. We accepted that the movement of beehives should be done under strict conditions. The Minister called upon agricultural industries to work on sector operational protocols that would ensure adherence to the measures announced by the President. In this regard SABIO further put forward its sector operational procedures (see this Protocol under the COVID-19 Report elsewhere in this Journal).

Under these strictly controlled conditions SABIO issued about twenty permits to its Professional Members, while approximately forty 'day' permits were issued to semi-commercial beekeepers including bee removal operators. During the extended lockdown period, i.e. up to 30th April, twenty-five permits were issued to SABIO Professional Members and approximately seventy 'day' permits to semi-commercial beekeepers, including bee removal operators. No permits have been refused. In conclusion it can be stated that the Industry acted in a responsible manner, serving those who had a need to maintain and move beehives under the COVID-19 Level 5 Lockdown regulations.

Since the 1st of May, the Country moved to Level 4 Lockdown restrictions. In this period, maintaining and movement of beehives was opened up to all beekeepers, although still under controlled conditions. The two most important conditions that remain are no movement across provincial borders and a curfew, which applies from 8 pm to 5 am. Beekeepers will still require a permit if they need to operate outside of these restrictions.

We once more urge beekeepers to comply with the Lockdown measures as announced by the President and also to familiarise themselves with, and implement, the Protocols as proposed by SABIO as industry body.

Adriaan du Toit

Chairperson

Unlockyour potential with DEKALB®innovation

A26513/BJ

Theinnovative technologyand yield potential that formpart of DEKALB®genetics,ensure that producers can lookforward to a maizecrop to beproudof. Ourclients are important to us, therefore our technologyand research are supported byexpert advice and professional service to unlockthe full potential of our producers.

DEKALB SEED YOUR SUCCESS

www.dekalb.co.za DEKALBSouth Africa
DEKALBSA dekalbsa

Impact of COVID-19 Pandemic on Beekeeping

By: Raffaele Dall'Olio – April 9, 2020
BeeSources, Bologna, Italy

PREMISES

Beekeeping is an activity closely aligned with the seasons, with fluctuations depending on latitude. In temperate zones there are large fluctuations with seasonal changes, while it is almost a non-stop activity close to the Equator. The impact of the COVID-19 pandemic on beekeeping depends absolutely on the timing of the introduction of restrictions with respect to the honey bee season.

The size and structure of beekeeping activities is highly variable across countries, with respect to the number of hives per beekeeping operation, average age of beekeepers, the economic drivers of the local industry (production of live bees, pollination service, honey production, royal jelly production). This preliminary impact analysis has been performed over the last few weeks due to the urgency of the matter, mainly through the use of a personal network of trusted contacts (national beekeeping experts, beekeeping companies, veterinarians/ scientists) and to a lesser extent through searching the web for articles, but without having time to verify the sources. A quantitative analysis is not possible at the moment. The economic consequences of the impact will become more evident in the forthcoming months.

Direct reports from Italy, France, Switzerland, Slovenia, Denmark, Germany, The Netherlands, Austria, UK (Europe), Turkey, Israel (Middle East), USA, Canada (North America), Thailand (Asia), New Zealand, South Africa (Southern hemisphere) have been collected.

OUTCOMES

The timing of the COVID-19 pandemic couldn't have been worse in the Northern hemisphere: March and April are in most countries the beginning of the season, when colonies are in a period of rapid development and need extra care to secure production through the season. Additionally, most of the pollination services for orchards (e.g. apples, cherries, almonds, citrus, blueberries, avocadoes) take place during this period, requiring extra hive movements and careful timing of beekeeping operations (not to expose bees to pesticide spraying at the end of the blooming or during honey harvesting).

Apimondia (International Federation of Beekeepers Association) on 31 st March 2020 released a statement directed to governments worldwide to stress the importance of maintaining regular beekeeping activities , but several countries had already issued restriction policies before that date. Most countries in Europe realized the importance of bees for food production, thus allowing the transport of hives; additionally, the 'livestock' status of honey bees allowed the owners to perform husbandry. However, given the different designation of bees in agricultural systems and restriction measures applied by each country, some special situations have to be highlighted (eg. See South Africa below).

Migratory Beekeeping / Pollination Service

In Turkey, migratory beekeeping is not possible since all city entrances and exits are closed and intercity travel is prohibited. About 75% of bee colonies (about 5.2 million) are overwintered in temperate areas such as Antalya, Muğla, Mersin. As of March 15, beekeepers would normally have been transferring their bees to production, but the bees remained in the same area due to the banning. The beekeepers either cannot go to the bees or went there in early March, and now they cannot get them out.

In the USA, almond pollination takes place at the end of February in Northern California and about 90% of US honey bees are moved there. California was one of the first states to lockdown. Migratory beekeeping is still allowed, but large distances and huge truckloads of colonies, requires special skills in drivers and operators. With a delay in operations there is an increased risk of pesticide exposure, a delay in travelling can result from additional checks at interstate lines and shortage of specialized labour (COVID19 positive or symptomatic individuals put in isolation), the late blooming pollination service (e.g. apples, blueberries in the north or secondary blooming such as watermelon in the south) will be affected. Additionally, the reduced market demand for farmers' produce might cause them to forego pollination as usual to save some costs.

A peculiar case is South Africa where bees are not regarded as livestock, and where the national government and DALRRD (Department of Agriculture, Land Reform and Rural Development) insisted that bee movement during lockdown should be kept to an absolute minimum. There was very little time available before the lockdown, to put a system in place that would allow permits to be issued to beekeepers. SABIO (South African Bee Industry Organisation) and some of the regional beekeepers' associations managed to arrange permission for permits to be issued for essential movement of beehives for pollination. In addition, day permits were issued to smaller beekeepers who did not need to travel on a daily basis, but needed to visit colonies periodically and also made provision for emergency bee removals. Blueberry pollination was secured, but later blooming crops might be compromised due to lack of staff. This is also a potential problem for other crops such as avocadoes, macadamias and honey harvests from hives in the Sunflower fields. For the initial period of COVID-19 lockdown, not all beekeepers needed permits to operate as a large number

were part-time and not operating on a professional basis. The introduction of a curfew and the need for permits to cross provincial boundaries has complicated beekeepers' operations significantly, although it is still possible to get permits to cross provincial boundaries and to operate during the curfew.

Most countries in Europe allow regular bee movements (special permit needed), but other factors might complicate long distance travel (social distancing, person per vehicle restrictions, hotel / restaurants closed, reduced working hours for petrol stations, etc..). In Thailand, movements across districts is possible only with a special permit and a fever check.

Staff recruitment / Staff safety

This is mainly affecting large size commercial companies. North America (labour from Mexico, Philippines): in US many commercial beekeepers hire international migrants on H2A visas during the honey production and pollination seasons. This has been difficult because the H2A visa granting process is slower. Furthermore, some H2A employees may have to go through a two-week quarantine period (depending on where they are coming from). In Europe UK, Italy, Turkey (labour from East Europe, North Africa) are the most affected countries. Few companies are reported to be affected in several other EU countries like Austria and Denmark. Even where contracts had already been signed, lack of flights and banning of movement across borders prevented employees from reaching their destinations. This resulted in an extra workload for the permanent staff and the employment of non-skilled labour, both factors increasing the risk of incidents.

New Zealand was stuck by COVID-19 at the very end of beekeeping season (entering winter). Large companies invested in extending the contracts of seasonal employees, to secure them for the next season (starting in September), since there is a high risk that if they were to return home, borders would still be closed. This is indirectly impacting on Canada, since several employees were used to moving' between the two countries, taking advantage of the reversal of seasons in the two hemispheres.

Several countries issued guidelines for the safety of employees due to COVID-19 epidemic. The extra safety measures needed, have resulted in increased costs and the slowing down of operations: limitations to number of people per vehicle (1pax New Zealand, 2pax Slovenia, Italy, Germany, South Africa), working conditions for staff, face masks, extra cleaning, social distancing during field work.

Shipments

Malfunctioning and delay in shipments occurred at the beginning of the crisis, but now things have improved but are far from regular. The most affected country here is Italy, since it is the largest provider of live honeybees (queens, package bees, nucs) to northern Europe and the time window for this market is very short (March to May). Several orders have already been cancelled, and the high risk of unexpected delays occurring (live bees have to be delivered in 24-48hours) in shipments is stopping production. Countries that are most affected are providers of live bees (e.g. Italy, New Zealand, Chile, California/Hawaii). International trade in honey had slowed down before the COVID crisis, waiting for the 2020 production and its recovery is uncertain.

In North America, Delta and United Airlines have declined to carry bees. Northern US states and especially Canada will suffer greatly: their industry, given the severe and long winter, is strictly reliant on March/April importation of package bees from New Zealand and from the southern US states (California and Hawaii). There will be no packages available, thus local colonies may not be healthy and strong enough to provide pollination services and the usual honey production.

In Turkey shipments take place regularly via cargo, but delivery is to limited to the main cities. People from neighbouring districts cannot go to collect shipments, thus movement of bees and equipment has stopped.

Special situation for the vulnerable (elderly) beekeeper community

In several countries the beekeepers' population is largely composed by over 60 y.o. In Turkey every person 65 y.o or elder cannot travel: several beekeepers belong to this group (managing about 3.5million hives), and their bees are currently neglected (some younger beekeepers have offered to help), hungry and vulnerable to disease.
Even where there is no imposed age-banning, elderly beekeepers might decide to self-isolate: in the northern hemisphere, this will result in increased swarming and incidence of disease due to lack of proper husbandry, with a fallout effect on the health of neighbours' apiaries. In New Zealand and in The Netherlands most elderly beekeepers reportedly decided to self-isolate and stopped inspecting their colonies.

How should we react?

Starting from March 4 (Apimell, ITALY) all exhibitions, congress, meetings were progressively cancelled in every country. Bee Clubs have stopped their activities and regular technical assistance: some countries (e.g. Italy, Denmark, Turkey, Netherland, UK, South Africa) are slowly moving to online webinars and technical assistance via e.g. WhatsApp. In countries like Switzerland, where the veterinarians have been restricted, a resurgence of bee diseases is to be expected. Generally speaking, the experience of online webinars and meetings, altogether with the increased share of

online honey sales, will push the industry toward a much-needed technological improvement, resulting in an increased awareness of producers and hence the possibility of increasing incomes through direct sales (already occurring e.g. in Finland, Denmark, Austria).

The current situation has forced changes to 'business as usual' behaviour and highlighted some weaknesses in the global beekeeping industry that might turn into opportunities. The COVID-19 impact on beekeeping in China hit very hard: total lockdown exposed millions of hives to starvation and disease, with a huge impact on production expected (China is the world leader both in honey and royal jelly production). Several countries expect this will positively affect local sales and the US has already experienced an increase in the price of the local product. Last, but not least, diminished frequency of management of colonies is reducing stress on them, while increased swarming and reduced treatments might allow natural selection to act on the bee population, allowing for the propagation of genes that will positively affect managed colonies in the future.

ACKNOWLEDGMENT: I wish to thank the COLOSS network since most of the information has been provided by people that I first met at a COLOSS event or through them. Additionally, a personal thank to Mrs. Maria Ricci (FAO) for stimulating this study and help with editing this text.

Raffaele Dall'Olio (owner BeeSources) is a beekeeper and a Ph.D. animal biologist (University of Bologna) with a master's degree in honeybee pathogen diagnostics (University of Pisa), skilled in artificial insemination of honeybee queens. He has more than 12 years of experience working with the Italian National Institute for Beekeeping (now CREA) in honeybee research and teaching focusing on genetic conservation of honeybee races, detection of pathogens and viruses, improving the quality of beekeeping products.
He is a member of a number of international research networks: COLOSS (an Executive Committee member 2016-2019&2019-2022), RNSBB (Research Network for Sustainable Bee Breeding) and IHBBN (International Honey Bee Breeding Network - founder and Managment Board member). Raffaele has more than 50 publications in the field.
As a beekeeper Raffaele has had commercial experience with Camperchi srl in Tuscany, Italy (2008), queen-rearing experience for OHB (2019) in USA, Steens LDT (2014-2015) and bee-health monitoring for Manuka Health (2017) in New Zealand, while currently managing his own 80+ hives.

COVID-19 IMPACTS ON SOUTH AFRICAN BEEKEEPING

**By: Dr Hannelie Human,
Prof Christian Pirk and
Prof Robin Crewe
From the University of Pretoria**

The South African government instituted a national lockdown starting on the 27th March 2020. The initial lockdown regulations (3-week period) Regulations R398 of 25 March 2020, have negatively impacted on honey sales and bee removals. This has continued with the extension of the lockdown. South Africa beekeeping operations distinguish between hobbyists, small scale, developmental and commercial beekeepers. The permission obtained to issue movement permits to beekeepers allowed for essential pollination operations, day permits for essential beekeeping practices and emergency bee removals. Small operations have come to a halt and this is problematic since in certain areas there is a lack of forage for bees (due to drought or fires) and the bees need to be either moved or fed.
Information on the consequences of the lockdown for beekeepers was obtained with the help of beekeeping associations and their members throughout South Africa. The following is a compilation of the feedback received.:

Staff recruitment
Bigger beekeepers or beekeepers in partnerships either have no staff or are allowed a maximum of 2 employees with reduced working days. They need to do the required work themselves, which is often impossible to accomplish. Employees need motivation to report for work or have a negative attitude, this is due to perceptions that employees are on "paid leave" as a result of the statutory lockdown. Another challenge is the requirement that all employees have to be supplied with documents to allow them to work.

Prolonged lockdown measures will have a negative impact on honey harvesting, and on the timing of honey harvesting and extraction. Honey may crystallise in frames and if the supers are harvested and stored, waxmoth and small hive beetle infestations may arise very quickly

Staff safety and transport
Large monetary investments were made to put safety measures in place, including immune supplements, protective gear and sanitisers. Long distance walking in public areas is prohibited and has resulted in increased transport costs. There is the ongoing expense of providing for continual use of disinfectant, masks, gloves, washing of hands when handling hives and moving between apiaries and travelling between apiaries.

Transport costs for employees, and for the employer have risen because public transport is restricted in terms of operating hours and carrying capacity. In addition, it is currently not sufficiently safe in relation to the transmission of COVID-19.

Equipment supplies
Some beekeepers have enough supplies for their operations at the moment, but those that need to purchase equipment have not been able to do so since shops are closed. Beekeeping equipment suppliers have been impacted by the limitations on movement and restriction of operating hours . It is therefore expected that equipment suppliers will report a decrease in equipment demand and losses in revenue. Uncertainty over the availability of material to manufacture new (replacement) hives, might occur due to disruption of supply chains and lack of human resources to produce the equipment

Migratory Beekeeping/Pollination service
SABIO (the South African Bee Industry Association) obtained permission from the Government to issue permits to beekeepers during the lockdown period. These permits allowed for the movement of hives for essential pollination, beekeeping activities as well as emergency bee removals. Other regional/provincial associations made alternative plans for permits to accommodate their beekeepers. However, all these measures still had to adhere to requirements as stated in the various regulations for the lock down period.

Lockdown regulations made this movement more difficult since a limited number of people are allowed to travel in each vehicle. Increased hygienic procedures have had to be put in pace (see above). All these measures have increased input costs.

The South African Bee Industry Association was instrumental in putting in place a comprehensive COVID19 Beekeeping Best Practice guideline, that is published as "Permit General Conditions" with the issuing of each permit. This placed a huge administrative burden on the Industry office as this process is managed by non-remunerated officials.

Shipments - Queens/Nucs
Orders and deliveries of queens were negatively affected at the start of the lockdown. Beekeepers were unable to collect nuc's and queens on order and move them to their apiaries. Many clients are hobbyist beekeepers and are unable to obtain a permit. Another concern is whether orders will still be confirmed after the lockdown due to clients' financial constraints.

Queen rearing operations had to be curtailed earlier than planned, making requeening of production colonies during the month of April impossible. Aloe season is fast approaching and is normally used for

colony build up for the coming season as well as for pollination later in the year. All of which is now in jeopardy.

At the end of the initial 21-day lockdown additional losses were observed: upon inspection of breeding apiaries a number of main breeding stock colonies were found to be heavily infested with capensis clones, with the likelihood that all of these colonies would be lost. This infection would have been detected and treated much sooner, had it been possible to visit the apiaries more often.

Meetings/Exhibitions
Official meetings, beekeeping courses and conferences are on hold with a negative impact on income and information dissemination. The annual South African BEECON meeting scheduled for July 2020 will have to be postponed with the resulting of loss in sponsorship income. World Bee Day on 20 May 2020 an official FAO event that was to be hosted in South Africa has been cancelled.

The South African Bee Journal, the SABIO Website, provincial association websites and newsletters remain the best means of communication and it is a priority to distribute these to all beekeepers and not only to members as was the practice in the past.

Bee Association meetings/Technical assistance
Assistance is available on WhatsApp groups, the internet, and books; while using Zoom is an effective and efficient means of conducting meetings. An Industry representative WhatsApp group could be created to effectively discuss and strategize regarding response to the statutory lockdown.

Sales/Cashflow
The impact on sales and cash flow depends on the scale and type of business. In the short term for beekeepers involved in pollination, there is little effect on cashflow because pollination is about delivering a service. Honey producers are experiencing a huge impact on cashflow (45% reduction), due to restrictions on movement as well as selective opening of shops and also reduced shopping hours. Bee removals have been impacted (45% drop) since only urgent removals are allowed. It should be stated that bee removals in urban areas provide an important income to beekeepers due to the defensiveness of our African honeybees. With the approaching global financial recession, the beekeeping industry as a whole will be negatively impacted, resulting in job losses and reduced job creation.

Daily operations
In most areas, the impact of the initial three-week lockdown on daily operations were not too large. However, this will change significantly with further extensions of the lockdown which have been further complicated by the introduction of a curfew. The biggest concern is an increase in the levels of vandalism and theft. With ongoing lockdown, provision needs to made for feeding, hive maintenance and final rounds of honey harvesting. Preparation of hives to be used in pollination is variable across provinces, due to production seasons. Thus far, it is mostly preparations for berry pollination which started at the end of March 2020. A lot of time has been lost to implementing hygiene practises, and working hours have decrease, causing an increase in cost of all daily operations . Relief will only come with a relaxation of lockdown restrictions.

Husbandry by elderly beekeepers
The majority of our beekeepers are elderly and hence must rely on support staff. This has been difficult with the social distancing requirements and vehicle use/ sharing regulations. Beekeeping bakkies are flat beds (single cabs) so only the driver is allowed in the vehicle. If a helper is needed, two vehicles must be used, increasing the overall operational costs. .

Individuals with the necessary permits and documents to continue with beekeeping operations have offered to help elderly beekeepers (highest risk for Covid-19), deal with their hives when needed but with no physical contact and social distancing. An example: If a beekeeper harvests for an elderly beekeeper, their gloves are disinfected before and after harvest. Supers are delivered to the receiving beekeeper in their presence but at a distance. They then use gloves and masks after the departure to collect the supers. The elderly beekeepers are advised to start the processing of their supers five (5) hours after delivery.

Other impacts
- The biggest challenge is the reluctance of workers to return to work.
- Bee removals were not accommodated adequately in terms of the permit system.
- There have been isolated reports of increased vandalism as beekeepers have not been able to do regular patrols. Vandalism may increase because unemployed people may start robbing honey from hives.
- Currently the lockdown situation is constraining effective vehicle maintenance.

POSITIVE (if any)
- Owing to less traffic on the roads, time required for travel between apiaries has been reduced.
- Road verges contain more flowering bee plants since mowing frequency has been reduced. This observation suggests that neat verges may be aesthetically pleasing but timing of mowing may be ecologically desirable for the benefit of bees/ beekeeping.
- Having to adjust to what may well be a "new world" brings challenges that need to be addressed, so the time to think deeply and change approaches is needed to ensure that we are more adequately prepared to deal with next pandemic with significantly reduced disruption.

The difficulties that are outlined above demonstrate that little thought has been given to the impact of pandemics on an industry like the beekeeping industry. Hopefully, the strategies and procedures that are put in place as a result of the current painful experiences will provide the beekeeping community with resilience in dealing with future crises.

uBusi BEEKEEPING



Pollination Services



Beekeeping Equipment

Bee Things Shops

Swellendam · Mosselbaai · George · Barrydale

info@ubusibeekeeping.com
www.ubusibeekeeping.com
028 514 2402
076 430 7401
1 Faure Street
Swellendam 6740

Advance Management CONSULTING

Food safety. A market standard for consumer confidence. Food manufacturers are asking their suppliers to use a Food Safety system, large companies are asking their co-packers to employ it and private label retailers are insisting that a Food Safety Management System be in place at private label manufacturers prior to any products being purchased.

THE FOOD SAFETY MANAGEMENT CONUNDRUM USED BY ADVANCE MANAGEMENT CONSULTING DURING MANAGEMENT SYSTEM DEVELOPMENT

EXPERIENCE IN MANAGEMENT SYSTEM IMPLEMENTATION:

We engage lead consultants who have a collective 60+ years of experience in Food Safety and Quality Management Systems specializing in the following certification systems:

- HACCP SANS 10330:2007,
- ISO 22000 conversion to 2018 edition
- FSSC 22000 version 5: 2018 and GFSI Basic and Intermediate level
- ISO 9001:2015 edition
- ISO 14001:2015 edition
- BSI OHSAS 18001:2007 and conversion to ISO 45000:2019 edition

DR ADRIAAN DU TOIT
Cell phone: 083 306 1446
adriaan@serurubeleafrica.co.za

20 MAY IS WORLD BEE DAY

by Natasha Lyon

World Bee Day is on 20 May and LYON RAW Artisan Honey is committed to creating awareness of our honey bees and their worldwide decline. We simply cannot sustain our food resources without the crucial work of pollinators, of which honey bees are the most important. Please help our honey bees by saying NO to harmful pesticides. Instead, explore companion planting to manage garden pests. Delay pruning of shrubs and trees until after flowering and remember that many weeds are a great source of pollen and nectar.

Buzzing bees is one of my favourite sounds, reminding me of tasting those first golden drops straight from the honeycomb and the glorious scent of fresh honey. It is however the bee's role as pollinator that is of such vital importance. These little miracle workers are the world's most important pollinators and, according to the Food and Agricultural Organisation of the UN, 78%–92% of the Earth's flower and seed–producing plants depend on bees (and other pollinators) for their survival.

The honey bee is the most important single species for crop pollination, responsible for pollinating two–thirds of the world's food resources for humankind. If you enjoy apples, berries, cucumbers, pumpkins, melons, stone fruit and avocados – to mention but a few – you have our honey bees to thank. Some crops, including blueberries and cherries, are 90% dependent on honey bee pollination while almonds are entirely dependent on the honey bee. Sadly, our honey bees are dying off at an alarming rate. Loss of habitat, lack of foraging, diseases, alien bee invasions, and the overuse of pesticides are some of the causes for their sharp decline.

At a honey bee talk, a little girl asked me if it was possible for honey bees to die out entirely. Let me tell you a Hanyuan County story. In the south Sichuan province of China, Hanyuan is home to pear orchards which carpet the mountains down into the valleys. This region is entirely dependent on this crop. And it **isn't** the honey bees they have to thank. In fact, the honey bees died out due to uncontrolled use of pesticides in the 1980s. They lost their entire bee population. Now in April each year,

the pollination of each blossom is done by hand. Needless to say, humans are far less efficient pollinators than honey bees. Labourers stand on ladders and use a long bamboo stick, with feathers attached to the end, to transfer pollen from one blossom to the next.

So yes, it is possible for our honey bees to die out entirely. The question is; can we afford for this to happen??

HERE IS HOW YOU CAN HELP SAVE OUR HONEY BEES

- Please say NO to pesticides. Even "bee friendly" chemicals which do not kill the honey bees on contact are harmful. Research suggests that these chemicals may interfere with the honey bee's ability to navigate and may also affect the development of the baby bees. Rather, explore companion planting to manage garden pests.
- Allow flowers to bloom before pruning hedges or shrubs. Pollen is a source of protein whilst nectar provides carbohydrates for honey bees.
- Some weeds are wonderful bee food so it may be fun to create a ''weed bee sanctuary''spot in your garden.
- Plant for bees. Nathalie Strassburg has a wonderful website which is worth a visit www.medicinegarden.co.za Her website includes useful information on companion planting.

- Support our beekeepers by paying fair pricesfor honest,real honey.It takesmany trips to apiary sites and hours of labour to tend to honey bees. Public donations to support our beekeeping industry can also be made to SABIO (website below).

WHEN HONEY BEES MOVE IN…

In Celtic mythology, the honey bee is a messenger between our world and the spirit realm, and is often associated with wisdom. In ancient Egypt, it was believed that the sun god Ra created the honey bee from his tears and that messageswere delivered to earth by honey bees 'dripping' straight from the face of Ra.

Due to the diversity of well–established gardens, we have someamazing sanctuaries for honey bees. It can also be scary when a swarm of honey bees moves in. As I learn about this super organism and its highly complexsocial structure, I realise that honey bees are defensive insects and not innately aggressive. When gardens have a selection of indigenous and exotic forage plants, honey bees are likely to 'move in'. Perhaps, if you believe in mysteries, the honey bee's arrival is a sign of spiritual wisdom. .

Honey bees will naturally occupy roof cavities, meter and pool motor boxes, drums, waste bins, bird logs, hollow tree trunks and any space in which they feel at home and protected from the elements. Every colony's choice of home is unique and many factors determine if, when and how the bees should be relocated. Generally speaking, if the honey bee colony is located within your property, you have the mandate to select and pay for your own honey bee removal. Never attempt to do this yourself and please use SABIO accredited experts. However, if the colony is in a manhole situated outside your perimeter wall, then the respective telecommunication company have the mandate to select their own honey bee removal service. It is important to consult your body corporate or home owners association in this regard.

Ideally, honey bees should be removed at night when all the bees are in the hive. A honey bee colony can vary between 30,000 – 60,000 bees. Up to a third of the bees will be out foraging during the day. A daytime removal may result in the 'girls' arriving back home with their treasures of nectar and pollen, only to find the rest of their family gone. Honey bees are social insects and without the rest of the super organism they will die off. However, the length of time the bees have occupied their home, combined with other variables, will determine the viability of a daytime removal. SABIO accredited experts will re–hive the swarm, where possible, so that the bees can be relocated successfully.

As with any professional service, Honey Bee Removal experts charge a fee for their time, labour and travelling costs. Please visit the South African Bee Industry Organisation's website www.sabio.org.za to locate a qualified honey bee removal expert near you. Details of Honey Bee Associations across South Africa can also be found on SABIO's website.

REAL HONEST HONEY

Honey is seasonal and, sadly, it is becoming one of the most adulterated food items in South Africa. Cheap imports and creative versions of honey are on the increase and it is very difficult,if not impossible,to tell the difference between natural honey and man–made syrup. Ethical beekeepers and honey bee farmers simply cannot compete with adulterated honey prices. So how do we address this? How do we support the honest, hard–working honey bee farmer and how do we know which is real honey?

I have spent a long time trying to address these questions with a value proposition which delivers premium raw honey, protects our honey bees through education and support our beekeepers by paying fair prices for real honey. The best guidance I can give is that you need to know where your honey comes from. Ask questions about the honey extraction process, apiary location, type of foraging and who the beekeeper is. Be prepared to pay a fair price for real honey. Keep in mind that no two honeys are the same. The nutritional properties of honey along with the colour, aroma and flavour is determined by the type of foraging, weather patterns and the type and quality of soil in which the flowering plants and trees grow.

South Africa is well known for our amazing selection of honeys, believed to be some of the best tasting in the world.

It takes 12 honey bees their entire life's work to produce 1 teaspoon of honey; surely a reason to savour every sacred drop!

For further information relating to honey bee talks and private honey tastings, please email natasha@lyonfamilysa.com, SABIO member, Southern's Beekeeping Association member, training steward – Honey Judge Guild of SA. For more information on World Bee Day visit www.worldbeeday.org.

SABIO would like to express their sincere gratitude to EIA Publishing for their contribution to highlighting the worldwide decline and plight of Honey Bees, and the celebration of World Bee Day, in their various publications.

'This article was written by one of our SABIO and Southern Beekeeping Association members for various estate publications. The purpose of was to create awareness of our honey bees at a public level, in celebration of World Bee Day.'

REMOVING BLUE GUMS (Eucalypts): PLANT XENOPHOBIA AFFECTS BEEKEEPING

J. Moodie
Honeywood Farm, Swellendam, Western Cape, South Africa

What do blue gums and Covid19 have in common?

The NEMBA alien and invasive species document lists 5 gum species from about 200 that grow in South Africa – that is about a 2.5% of the total number of gum species in the country. Covid-19 claims a 2.5% fatality rate for those infected. Both statistics are relatively low, yet in the case of gums, all gum species, in practise, are seen as invasive and need to be removed. In the case of Covid-19 the response has been total lockdown and a shattering blow to the global economy. The total removal of gums has a similar effect on the bee industry, as vital bee forage is removed putting many potential pollination units at risk. The response in both cases may be justified, but both responses need to be carefully considered to ensure that oversimplified implementation of regulations that ignore the realities of the situation don't make the magnitude of the crackdown dangerous to those it claims to benefit.

What has prompted my reaction at this moment to the clearing of invasive gum trees? I have recently been made aware of the assumptions about gums following clearing of land adjacent to my property by contractors working under DEA supervision. My farm is part of a Grootvadersbosch Conservancy. The Conservancy is an implementing agent for the Department of Environment Affairs. Our alien clearing model works well as landowners contribute financially and support and manage the project successfully creating employment, clearing hectares of invasive species in riparian areas as well as restoring pristine fynbos. My father planted many species of gums for bee forage while he was alive and these extended up our driveway into my neighbours' land. This area was identified as an mbell area to be cleared. The contractors were told to remove the invasive wattle and blackwood but to leave the gums for bee forage. On completion and subsequent inspection, the DEA inspector refused to pass the clearing site as completed until all gums were removed. There were some cladocalyx, but the majority of trees were viminalis and ficifolia (see Fig.1 and 2). There were not many trees involved – probably about 12 in all, but I was, and still am, concerned about the principle applied here. Until the inspector had passed the clearing, no funds could be released for the task. The instruction was simply that all gums had to be removed (Fig.3). This has been done – bar one tree at the gate which I was able to save (see Fig.4). Not a serious loss in my case. However, if this is the attitude of DEA inspectors countrywide then we have a real problem.

There are, in fact, only five gums species listed on the alien and invasive species list:

NATIONAL ENVIRONMENTAL MANAGEMENT: BIODIVERSITY ACT, 2004 (ACT NO. 10 OF 2004) ALIEN AND INVASIVE SPECIES LISTS, 2016

Categories 1a, 1b, 2 and 3 Listed Invasive Species, in terms of which certain Restricted Activities are;
(a) prohibited in terms of section 71A(1);
(b) exempted in terms of section 71(3); or
(c) require a Permit in terms of Chapter 7. and must be read with the lists in Notice 3

134. River red gum Eucalyptus camaldulensis Dehnh. and hybrids, varieties and selections.
135. Sugar gum E. cladocalyx F.Muell. and hybrids, varieties and selections.
136. Spider gum E. conferruminata D.J.Carr & S.G.M.Carr and hybrids, varieties and selections (E. lehmannii misapplied in South Africa)
137. Karri E. diversicolor F.Muell. and hybrids, varieties and selections
138. Saligna gum, Rose gum (1) E. grandis W.Hill ex Maiden (E. saligna Sm. in part) and hybrids, varieties and selections but excluding in (a) above.
139. Forest red gum E. tereticornis Sm. and hybrids, varieties and selections

134 -139 a. Category 1b within- (i) riparian areas; (ii) a Protected Area declared in terms of the Protected Areas Act; or, (iii) within a Listed Ecosystem or an ecosystem identified for conservation in terms of a Bioregional

Plan or Biodiversity Management Plans published under the Act.
b. Not listed within Nama-Karoo, Succulent Karoo and Desert biomes, excluding within any area mentioned in (a) above.
c. Category 1b in Fynbos, Grassland, Savanna, Albany Thicket, Forest and Indian Ocean Coastal Belt biomes, but- (i) Category 2 for plantations, woodlots, bee-forage areas, wind-rows and the lining of avenues. (ii) Not listed within cultivated land that is at least 50 metres away from untransformed land, but excluding within any area in (a) above. (iii) Not listed within 50 metres of the main house on a farm, Exempted for an existing plantation. (iv) Not listed in urban areas for trees with a diameter of more than 400 mm at 1000 mm height at the time of publishing of this Notice, but excluding in (a) above.

What do the different categories mean?

enviroadmin@environment.co.za (quoted from the 'environment' website)
Last Updated 2019-02-13

Category 1a (PROHIBITED): Listed Invasive Species

A person in control of a Category 1a Listed Invasive Species must comply with the provisions of section 73(2) of the Act; immediately take steps to combat or eradicate listed invasive species in compliance with sections 75(1), (2) and (3) of the Act; and allow an authorised official from the Department to enter onto land to monitor, assist with or implement the combating or eradication of the listed invasive species.

Category 1b (PROHIBITED / Exempted if in Possession or Under control): Listed Invasive Species

A person in control of a Category 1 b Listed Invasive Species must control the listed invasive species in compliance with sections 75(1), (2) and (3) of the Act. A person contemplated in sub-regulation (2) must allow an authorised official from the Department to enter onto the land to monitor, assist with or implement the control of the listed invasive species, or compliance with the Invasive Species Management Programme contemplated in section 75(4) of the Act.

Category 2 (PERMIT REQUIRED):Listed Invasive Species

Category 2 Listed Invasive Species are those species listed by notice in terms of section 70(1)(a) of the Act as species which require a permit to carry out a restricted activity within an area specified in the Notice or an area specified in the permit, as the case may be. A landowner on whose land a Category 2 Listed Invasive Species occurs or person in possession of a permit, must ensure that the specimens of the species do not spread outside of the land or the area specified in the Notice or permit. Unless otherwise specified in the Notice, any species listed as a Category 2 Listed Invasive Species that occurs outside the specified area contemplated in sub-regulation (1), must, for purposes of these regulations, be considered to be a Category 1 b Listed Invasive Species and must be managed according to Regulation 3.

Notwithstanding the specific exemptions relating to existing plantations in respect of Listed Invasive Plant Species published in Government Gazette No. 37886, Notice 599 of 1 August 2014 (as amended), any person or organ of state must ensure that the specimens of such Listed Invasive Plant Species do not spread outside of the land over which they have control.

Category 3 (PROHIBITED): Listed Invasive Species

Category 3 Listed Invasive Species are species that are listed by notice in terms of section 70(1)(a) of the Act, as species which are subject to exemptions in terms of section 71(3) and prohibitions in terms of section 71A of the Act, as specified in the Notice. Any plant species identified as a Category 3 Listed Invasive Species that occurs in riparian areas, must, for the purposes of these regulations, be considered to be a Category 1b Listed Invasive Species and must be managed according to regulation 3.

What did I do about this and what are the possible solutions?

Funds had to be released and I accepted the decision as I had to – it was not my property. I was not able to save the few gums that were felled. I contacted directors at a senior level in DEA explaining my concern about the inspector's perception that all gums were on the list. I had some interesting and

constructive engagement, as the bee industry has had in the past, with regulations regarding bee forage and gum trees. One director said he did not like gum trees because he had fallen out of one as a child but proceeded to listen to me and try to find solutions. A difficulty in identifying different gum species was expressed. Were inspectors expected to be experts, able to identify which gums were invasive and which not? I said that I would be happy to help with any identification training or ask experts to do so. The cleared area was adjacent to a declared plantation, registered on my property. This registration had been done a few years back and had effectively stopped clearing of gums as well as stopping Eskom clearing a number of trees when doing line inspections. However, the trees alongside the plantation were not covered by that permit. What could I say? I had sent pictures of the trees identifying them as not invasive but this was apparently too late, although he was consulting with a tree expert about them. They said that this should have been done before the mbell was identified for clearing and a permit obtained in advance in order to save the gums. Once the contractor had tendered for the clearing, he had to clear everything. This would have been quite possible on my own property but how could I manage this on a neighbour's land?

Permits, I was assured are granted without difficulty on application for gums not in riparian areas:

No. 10 of 2004: National Environmental Management: Biodiversity Act, 2004.
87. The purpose of this Chapter is to provide for the regulation of the issuing of permits authorising- (a) restricted activities involving specimens of -
(i) listed threatened or protected species in terms of section 57 (1);
(ii) alien species in terms of section 6.5(1); or
(iii) listed invasive species in terms of section 71(1);
(b) activities regulated in terms of a notice published in terms of section .57(2);
(c) bioprospecting involving indigenous biological resources in terms of section 35
(d) the export of indigenous biological resources for bioprospecting or any other type of research in terms of section 81 (1)

What are possible future solutions to avoid all gums being removed?

1. DEA Inspectors need to be aware that the NEMBA list has only five species of gums listed as invasive. They may have difficulty recognising the different gums but here, bee-keepers, landowners and experts could assist with training and plant identification.
2. Landowners need to obtain permits in advance to allow categories of gums to be left for bee forage. This permit is not difficult to obtain on condition the gums are not in riparian areas. These gums then are exempted from the mbell tender for clearing and the problem is solved. Wind breaks, bee forage, shade for animals, large trees lining roads are all legitimate reasons to keep gums. This would mean that the landowner is responsible for managing the area covered in the permit in future without any assistance from the DEA.
3. Most Beekeepers have sites on land they do not own. In these cases, they need to discuss a permit application with the landowner, to ensure that bee forage gums are not removed. They also need to identify the gums their bees are foraging on in order to know if they are on the NEMBA list or not.
4. Gum plantations with a category 2 permit should be established. Timber is growing in demand and in short supply. More and more uses are being found for gum timber in construction and for furniture and decks. Landowners may find that an investment in planting gums turns out to be extremely worthwhile.
5. Bee associations, SABIO and all bee-keepers need to work hard at changing the commonly held perception that all gums are bad, invasive aliens that need to be removed. Unfortunately, this perception suits those looking for firewood, those wanting to see cleared sites, those who do not want to master botanical plant species knowledge, those clearing under power lines and the public in general, who simply see a large evergreen tree as "Just another Gum."

My main objective in sharing this is to increase awareness that, in terms of the number of gum species present in the country, there are not many listed as invasive – only five of them are. The fact that inspectors may not be able to identify particular species does not make removal of non-listed species legitimate.

Fig.1 Stand of Blue Gums before clearing

Fig.2 Stand fo Blue Gums outside entrance gate to Honeywood Farm

Fig. 3 Blue Gums cleared with no Reagard for species present

Fig.4 Lone Blue Gum remaining at gate

A closer look at South Africa's agricultural crop pollination – a beekeeping perspective

By: Tlou Masehela
South African Biodiversity National Institute (SANBI)
Cape Town

South Africa has a wide variety of farming activities due to its diverse weather and climatic conditions. These conditions enable the country to cultivate and produce a variety of grains, fruits and vegetables. Over the years, South Africa has also become a prominent producer and exporter of citrus, deciduous and subtropical fruits. Financial estimates indicate the South African fruit industry to be worth more than 30 billion (South African Rands). Annually, the citrus industry generates a turnover of about 14 billion, followed by the deciduous industry (11 billion) and the subtropical fruits (2.34 billion). The Macadamia industry is also worth noting, as it is one of the fastest growing crops across provinces such as KwaZulu-Natal, Limpopo, Mpumalanga and the Western Cape. According to the Southern African Macadamia Growers Association (SAMAC), more than 95% of South Africa's macadamia production is exported and this generates about R3.2 million per annum. These financial trends highlight the important role that each sector plays economically and its contribution to employment as well as household food security. However, for these industries to thrive, a few production inputs are needed.

For the purpose of this article, I will focus on managed honey bees, one of the important components of both the deciduous and subtropical fruit industries – although at times, undervalued if not somewhat overlooked. Managed honey bees provide the much-needed pollination services required for production in these sectors. However, the level and overall pollination service tends to vary among the industries. From a global perspective, pollinators (including honey bees) affect 35% of agricultural production and support the production of about 87 of the leading food crops. In South Africa, about 50 crops need insect pollination and to a large degree, the required pollination is performed by managed honey bees. Available literature supports this, indicating that farmers rely on beekeepers to bring honey bee hives to their farms for a few days or weeks during a crop's flowering period to provide the high density of bees needed for good pollination. As a result, our two indigenous honey bee subspecies (Apis mellifera capensis (Cape) and Apis mellifera scutellata (Savanna)) are vital to the respective industries as they are managed at the scale needed for this type of intensive large-scale production.

To better understand how managed honey bees are currently supporting the fruit industry sector across South Africa, I posed a few questions to beekeepers who are involved in the provision of pollination services to growers. The questions were as follows:

1. In general, how has the pollination landscape changed in terms of crops that require pollination (by managed bees) in the last 5-10 years: a) what are the main crops still being pollinate annually; b) what are the new crops that have come into the system; and c) how many hives per ha (on average) are used to pollinate the different crops.
2. Is the pollination of these crops still viable (financially) for beekeepers and what is the pollination fee range (if you know)?
3. What are some of the challenges experienced during pollination?
4. Is there a general adherence to Pollination Standards (if any) and compliance to inspections (when carried out)?
5. What are your general thoughts in terms of what you would like to see as positive changes regarding crop pollination in the respective provinces or South Africa?

In my view, it is mostly (only) beekeepers directly involved in pollination that are better placed to share their respective experiences, highlighting what is working well (has in the past) and what can be improved – or maintained for good service and relations – between themselves (beekeepers) and growers. Although I contacted beekeepers (selected) in all nine (9) South African provinces, responses were only received from beekeepers in Gauteng, Limpopo, Mpumalanga and the Western Cape. I consolidated and summarized their responses to the five (5) questions in Table 1. I further highlight similarities among provinces in terms of responses received and provide a brief perspective to these in Box 1.

BOX 1: Highlights and perspectives

- There is a clear change/shift in crop types across the different provinces. Macadamia and Blueberries appear to be expanding rapidly in the provinces as listed in Table 1. Avocado and Almonds are slowly making their mark in the Western Cape. These expansions are mostly driven by favourable climatic conditions, research into new cultivars and various market trends (e.g. increase in demand).
- Remuneration for pollination services varies considerably across provinces, crops and cultivars. Blueberries are the big money crop, followed by apples, pears and plums. There are still cases of non-payment for crop pollination in provinces such as Limpopo and Mpumalanga. Growers don't seem to know or understand the need to pay for pollination – more industry driven communication, education and lobbying is needed at both provincial and national beekeeping association levels to address the non-payment issue.
- The challenges experienced by beekeepers during (and after) pollination are very common among provinces. Some dominant challenges include: pesticide poisoning, vandalism, theft, lack of forage and the rise in feeding costs for hive maintenance. All these contribute to hive loses and security costs for beekeepers. However, some good strides have been made in educating growers on the responsible use of pesticides – communication on spraying programmes has also improved.
- Pollination standards and inspection services are not fully in place or adhered to across the provinces. This promotes the use of unregistered beekeepers to substandard hives for pollination services. In addition, there have been escalations in hive theft as some stolen hives get used to provide pollination services.
- The wish list for positive attributes tilts strongly towards coherence within the beekeeping industry in achieving better pollination remuneration and preventing undercutting, upholding a good level of professionalism by providing quality hives for pollination, improved level of education and communication between beekeepers and growers.
- The Capensis problem is still a major issue, contributing to high losses annually.
- The lack of good forage sites needs to be addressed across all provinces, as this compromises honey production and the standard of hives used for pollination.

Province	Response
Gauteng	**Main crops**: blueberries, water melon, spanspek **New crop**: macadamia **Colonies/ha**: 4-6 **Viability of service**: R 700/hive for 3 wks in blueberries ±R 400/hive in macadamia/month **Challenges**: Travel ± 400 km; spacing affecting bees and honey production; no security issues in macadamia **Pollination standards**: No information **Positive changes required**: Standardisation of agreements and costs
Limpopo	**Main crops**: avocado, mango, litchi, butternut, melon, macadamia **New crop**: blueberries **Colonies/ha**: 2-4 and up to 10 in blueberries **Viability of service**: Service in exchange for sites, unspecified payment for blueberry pollination **Challenges**: Hive overstocking with impact on honey production, farmer reluctance to pay for pollination service, vandalism and theft, honey badger **Pollination standards**: No standardization **Positive changes required**: Farmer recognition of pollination service, standardisation of agreements and costs
Mpumalanga	**Main crops**: macadamia, avocado, litchi **New crops**: blueberries, kiwi, dragonfruit **Colonies/ha**: macadamia 2-4; avocado 2-4; pear 2-4; litchi 2; blueberries & kiwi 4-5. **Viability of service**: Between R 500-950/hive per season; pollination income low; in some cases not charging for pollination service **Challenges**: vandalism & theft; pesticide poisoning, honey badger, ants, forage shortage in off season **Pollination standards**: No inspections, no quality control **Positive changes required**: Standardisation of agreements and costs; queen breeding and importing swarms; maintaining colonies in off season, addressing *capensis* problem
Western Cape	**Main crops**: blueberries, plums, pears, cherries, apples, butternuts, pumpkin, onion seed **New crops**: blueberries, macadamia, almond **Colonies/ha**: blueberries 5-15; plums 4-20; pears 3-5 in 2 waves; apples 2.5; onion see 6-8. **Viability of service**: Between R 600-850/hive per season- apples, pears, plums; R750-850 blueberries for 2 weeks; pollination income good but charged at 10-20% below WCBA recommended rate **Challenges**: blueberry pollination period starting much earlier; vehicle breakdowns; fatigue; night access to sites and farms, vandalism & theft; pesticide poisoning; mortality of colonies **Pollination standards**: lack of inspections, no quality control, growers unaware of standards and contracts **Positive changes required**: Unregistered beekeepers not used; Standardisation of agreements and costs; more professional pollination service; adherence to code of conduct; effective communication between keepers; mapping of apiary sites to reduce overstocking of forage sites; increased research on pollination of various cultivars and management practices; better communication between growers and beekeepers to co-ordinate pollination services

HOW REWARDING ARE MACADAMIA FLORAL REWARDS FOR POLLINATORS?

By: Dr Hannelie Human

University of Pretoria, Pretoria

The South African macadamia industry is currently the largest producer of nuts globally (Howlett et al., 2015; SAMAC, 2019). The last two decades have seen an exponential growth in the industry with an increased demand for honey bee pollination. At the end of 2018 there was an estimated 44 776 hectares of planted macadamias; this number is expected to increase annually. Macadamias are grown across the country with Mpumalanga (53%) being the major grower followed by Limpopo (30%) and Kwazulu-Natal (16%) (SAMAC, 2017). In 2018 the largest number of new trees were planted in KwaZulu-Natal (39%), Mpumalanga (36%) and Limpopo (22%) (SAMAC, 2019).

Macadamia crop yield continues to be challenging and an assessment of the contribution of honey bee pollination to crop yield is crucial (Howlett et al., 2015). A macadamia tree produces millions of flowers but of these only 0.3% may result in a nut (Lavi et al., 1996). Nut set is affected by a number of factors such as age and size of the tree, climatic conditions, pests and pathogens as well as pollinator visitation (Lavi et al., 1996; Ni et al., 2002).

In other parts of the world, stingless bees (Tetragonula sp) and honey bees (Apis mellifera L.) are considered to be the major pollinators of macadamias (Vithanage and Ironside, 1986; Heard and Exley, 1993). Many studies showed that managed honey bees are the most effective pollinators with increased flower visitation rates and pollination, an improvement in yield and nut quality (nut set, weight and size of nuts). Most studies on macadamia pollination are from Hawaii, Australia and California and it is obvious that management practices and availability of pollinators will differ between countries.

Unfortunately, only limited data is available on the effectiveness and impact of honey bee pollination in South Africa and the quality of floral rewards (pollen and nectar) of macadamias has not been studied. Little if any South African data is available with regards to the nectar and attractiveness (quality) of macadamia pollen, except that it provides small to medium amounts of pollen with a protein content of 16-22% (Stace, 1996). Some authors consider macadamia pollen as highly acceptable to honey bees (Shigeura et al., 1970) while Rhodes (2001) regard macadamia pollen as unattractive to honey bees.

Honey bees acquire all the proteins, minerals, vitamins and lipids essential for brood rearing, development and adult growth from pollen (Loidl and Crailsheim, 2001). The proportions of these nutrients vary extensively among different plant species (Roulston and Cane, 2000). Pollen composition is changed during collection and storage through the addition of nectar and glandular secretions that probably prepares the grains for efficient digestion (Roulston, 2005, Human and Nicolson, 2006). This and a specific bacterial flora associated with stored pollen, increases not only the digestibility but also the nutritive value of pollen for honey bees (Herbert and Shimanuki, 1978).

The protein content of pollen is considered to reflect its nutritional value (Pernal and Currie, 2000; Cook et al., 2003). honey bees collect pollens with protein contents ranging from 12 to 61% across all plant taxa (Roulston and Cane, 2000). Insufficient or poor-quality pollen (< 20% protein, dry mass) negatively impacts reproduction, brood rearing and longevity of honey bees (Human and Nicolson, 2006). Lipids are an important source of energy for honey bees and contribute to the production of royal jelly; pollens with the highest amount of lipids are preferable (Loidl and Crailsheim, 2001; Manning, 2001).

The small macadamia flowers produce small quantities of nectar (Nicolson and Van Wyk, 1998). There is no South African study that has evaluated nectar volume and concentration for macadamias. According to Kongpitak et al., (2012) macadamia nectar production peaks early in

the mornings (10-11 am) and in the early afternoon (1-2pm) (Heard, 1994) that will coincide with optimal pollinator visitation (Vithanage and Ironside, 1986). Insect visitation varies across and within orchards, throughout the day, between seasons (Howlett et al., 2015 and references therein) and can be attributed to weather, pesticide applications and other blooming plants or crops in the environment that may ultimately result in reduced yields (Trueman, 2013). Nectar concentration in plants range between 7 and 70%, (Nepi et al., 2001). Production rates vary with time of day, flower age, nutritional status of the plant and are influenced by environmental parameters (Nepi et al., 2001; Pacini and Nepi, 2007; Human and Nicolson, 2008). Drought and low water availability directly affect floral rewards and pollinator visitation; plants experiencing water stress are reported to produce less nectar (Carroll et al., 2001) with a decrease in pollination. honey bees collect nectar with a wide range of sugar concentrations (12-65% w/w), but prefer nectar with 30-50% sugar content content and will collect nectar with lower concentrations during times when they need to cool the hive (Nicolson and Human, 2008).

It is also known that an excess of mass-flowering crops can bring about limited foraging by honey bees (Grass et al., 2018). The study by Grass et al., (2018) in the Limpopo province clearly showed that honey bees were the dominant flower visitors to macadamia trees. In order to maximise visitation rates both the proximity and density of honey bee colonies need to be adjusted. Macadamia farmers are advised to stock orchards with 1-3 hives per hectare without advice on optimal placement of these hives (de Villiers and Joubert, 2003). The Grass et al., (2018) study showed that an increase in the number of honey bee colonies inside orchards did not necessarily result in increased crop yield but can actually result in reduced nut set.

Climate change with increasing temperatures, prolonged periods of droughts and water restrictions as well as the growing demand for pollination by managed honey bee colonies are challenges that the rapidly expanding macadamia industry will face. Macadamia growers reportedly benefit from honey bee pollination while beekeepers, apart from pollination fees, can harvest good honey crops if there are ample amounts of nectar.

Acknowledgement: SAMAC graciously provided research funding for the evaluation of the floral rewards of Macadamia integrifolia hybrids as well as the effect of honey bee pollination on crop yield. The data collected in this study will be used as baseline information for future propagation/breeding programs and recommendations.

References

The author can be contacted for a complete list of references used for this article.

"The least I can do is speak out for those who cannot speak for themselves"

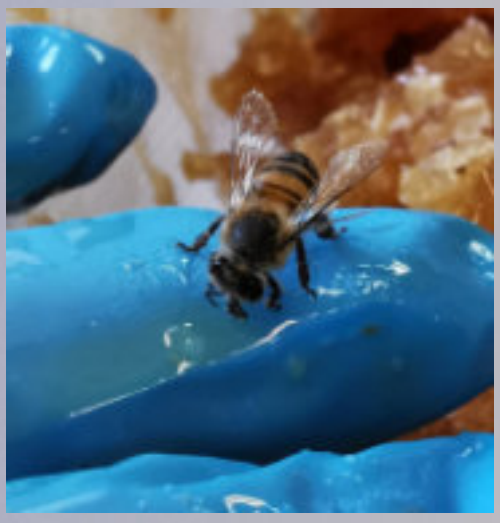
ANNOUNCEMENT

BEECON 2020

SABIO
SOUTH AFRICAN BEE INDUSTRY ORGANIZATION

We find ourselves in unparalleled circumstances, with the COVID-19 pandemic driving us to change the way we operate. With our upcoming annual BEECON and Annual General Meeting the SABIO Board needs to take into account the current regulations set by Government, in particular the announcement of a phased lifting of the current lockdown. It is clear that some of the restrictions will remain, although unknown to what extent.

As Organisation we are in full support of the Government's efforts to curb the pandemic. This being said we need to be realistic; current travel restrictions and limited attending numbers allowed at events will likely be the last restrictions to be lifted. This will without doubt lead to a reduced number of participants if our BEECON was to go ahead. We also have to consider the risk associated with a large number of people gathering in one place and then disperse to all corners of the country.



At this point in time it is necessary to announce the postponement of BEECON 2020 with no confirmed date, format and venue. As SABIO's chief aim is the dissemination of information, we shall make even greater efforts to ensure the timeous publication of the South African Bee Journal, packed with more content.

Thank you to our advertisers who are making this possible.

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

CONTACTS FOR 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 CONTACT THEM:

Riaan van Zyl: (Capensis)
Tel: 021 809 1702
Cell: 083 414 2494
Email: riaanvz@dalrrd.gov.za

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

COLOSS honey bee research association

COLOSS survey - Beekeepers sources of information

The COLOSS organisation (www.coloss.org) is an international network for beekeeping scientists and advisers . The mission of COLOSS is to improve the well-being of honey bees at a global level. There are several networks within COLOSS. One network is the B-RAP group (Bridging Research and Practice), which aims to connect science and the advisory work with the beekeeper's daily work/problems.

The B-RAP group has developed a survey with the aim to analyse what you as a beekeeper need from researchers and advisors to help with your beekeeping problems. In order to do this we ask you: How did you start beekeeping, what beekeeping education do you have, what kind of network do you belong to, how do you get information, what kind of training do you want, what are the biggest problems within your beekeeping, where do you think focus should be in the future?

We hope this questionnaire will be completed in more than 25 countries worldwide. We will use this as a tool a guide for the future extension activities and scientific work. We invite you participate in the survey! Please complete the survey by loading the following URL and completing the questions.

https://www.bee-survey.com/index.php/714781?newtest=Y&lang=en

South African local contact: christian.pirk@up.ac.za

Linde Morawetz and Lotta Fabricius Kristiansen, COLOSS B-RAP

simply bee
Natural Beeswax Products (Pty) Ltd

Say NO to harmful chemicals and let nature do the work!

Enhance the natural beauty of your skin with Simply Bee's natural products filled with beeswax, propoplis, honey and essential oils.

All our products are handmade with love and contains NO parabens, harmful chemicals, synthetic fragrances, petroleum compounds or palm oils. They are NOT tested on animals.

Showroom and Observation Centre
31a Church Street, Hopefield, 7355
West Coast
Tel: 022-723-0569
Email: info@simplybee.co.za
www.simplybee.co.za

SABIO
SOUTH AFRICAN BEE INDUSTRY ORGANIZATION

The following protocol should be followed by beekeepers when moving and or maintaining beehives during the further roll out of the Covid-19 lockdown period after 1 May 2020:

1. Beekeepers shall, as per the latest regulations issued under the Disaster Management Act, be in possession of the required travel documentation as follows:

- A valid identification document;
- Drivers licence;
- DAFF (DALRRD) beekeeper certificate; and
- Letter of employment for each worker present in the vehicle.

2. Prior arrangement with landowners to obtain permission to enter their property will be essential during this period where movement of people are to be limited. There should be limited contact with landowners and farm workers

3. When travelling, the number of workers should be restricted to meet the recommended number of passengers per vehicle.

4. Cloth face masks should be worn at all times

5. Hand sanitizer to be present in vehicle at all times

6. The load should be covered with a shade net to prevent flying bees where this movement is carried out during day time

7. The same provisions to apply to bee removal services, for removal of wild bee colonies which may put humans or animals at risk due to stinging behavior

8. Beekeepers shall be registered by DALRRD and shall mark beehives with the registration mark allocated by DALRRD

9. Beekeepers shall comply to all other Regulations applicable to the movement of bees, i.e. disease notification as applicable, capensis infestation and movement across the dividing line (see SABIO website)

10. This Protocol shall remain in place until such time as the COVID-19 lock-down is lifted or new measures are announced by DALRRD.

APIMONDIA Statement on Honey Fraud

Extracts from the APIMONDIA 2020 Statement on Honey Fraud. For the full document see
www.apimondia.com

PURPOSE

APIMONDIA Statement on Honey Fraud is the official position of APIMONDIA regarding honey purity, authenticity, fair modes of production, and the best available recommended methods to detect and prevent honey fraud.
This Statement aims to be a trusted source for authorities, traders, supermarkets, retailers, manufacturers, consumers, and other stakeholders of the honey trade chain to ensure they stay updated with the current concepts and new testing developments regarding honey purity and authenticity. It is also a guide to promote best practices for the prevention of honey fraud and all of its insidious negative side effects on bees, beekeepers, crop pollination, and food security.

MODES OF HONEY PRODUCTION

APIMONDIA has a role in continually guiding the sustainable development of apiculture globally, and always supporting the production of high quality authentic natural honey containing all the complex properties given by nature.
APIMONDIA supports only those production methods that allow bees to fully do their job in order to maintain the integrity and quality of honey for the satisfaction of consumers, who seek all the natural goodness of this product.
APIMONDIA rejects the development of methods intended to artificially speed up the natural process of honey production through an undue intervention of man and technology that may lead to a violation of internationally accepted standards. Table 1 outlines such practices and how they violate the Codex Standard (1981) and the European Honey Council Directive 2001/110/EC (2001).

ABOUT THE DEFINITION AND ESSENTIAL COMPOSITION OF HONEY

Codex Alimentarius (1981), the internationally accepted standard for foods issued by the FAO, contemplates the biological aspects of honey production and defines:
"Honey is the natural sweet substance produced by honey bees from the nectar of plants or from secretions of living parts of plants or excretions of plant sucking insects on the living parts of plants, which the bees collect, transform by combining with specific substances of their own, deposit, dehydrate, store and leave in the honey comb to ripen and mature."
APIMONDIA adheres to the Codex Alimentarius (1981) definition of honey and to its description of essential composition and quality factors:
"3.1 Honey sold as such shall not have added to it any food ingredient, including food additives, nor shall any other additions be made other than honey. Honey shall not have any objectionable matter, flavour, aroma, or taint absorbed from foreign matter during its processing and storage. The honey shall not have begun to ferment or effervesce. No pollen or constituent particular to honey may be removed except where this is unavoidable in the removal of foreign inorganic or organic matter".
In summary, according to APIMONDIA, honey is the result of a complex process of transformation of nectar/honeydew that occurs exclusively inside the beehive. Honey is unique because of its production process and its composition.

CONCLUSION

The crisis provoked by Food Fraud has deepened and broadened. At the same time, awareness of the crisis has grown.
There has never been a period in human history during which the importance of and concern for the world's bees and their keepers has been so widespread. This means the importance and imperative of APIMONDIA's work is acute and encouraging.

Table: Modes of honey production and processing that violate the Codex standard (1981) and the European Honey Council Directive 2001/110/EC(2001)

	PRACTICE	WHAT IS VIOLATED?
PRODUCTION	Harvesting of immature honey as a systematic and purposeful mode of production	• Bees have insufficient time to mature honey and add specific substance of their own by multiple manipulations • The transformation of nectar into honey is only partially made by bees, and human intervention completes the process in an illicit manner
	Artificial feeding of bees during a nectar flow	Honey must be produced by honey bees from the nectar of plants or from secretions of living parts of plants or excretions of plant-sucking insects on the living parts of plants
PROCESSING	Honey dilution with syrups.	Any additions to honey other than honey are ruled out (including those substances that are contained naturally in honey)
	Dehydration of extracted immature honey with technical devices, such as vacuum dryers, tec.	Moisture reduction of immature honey is an inseparable part of the maturation process, which must be done exclusively by bees.
	Use of ion-exchange resins to remove residues, offensive aroma, constituents for quality control (HMF), and the lighten of honey	Honey shall not be processed to the extent that its essential composition has changed and/or its quality is impaired. No pollen or constituents particular to honey may be removed
	Pollen addition to honey with the purpose of disguising the botanical and/orgeographical origin of the product	Any additions to honey other than honey are ruled out (including those substances that are contained naturally in honey)
	Masking and/or mislabelling the geographical and/or botanical origin of honey	Honey may be designated by the name of the geographical region if the honey was produced exclusibely within the area referred to in the designation. Honey may be designated according to the floral or plant source if it comes wholly or mainly from that particular source and has the organoleptic, physicochemical and microscropic properties corresponding to that origin.

van der laan
insurance brokers
versekering makelaars

2 Geldenhuysstraat Delmas 2210
Privaatsak X206 Delmas 2210

Tell. 013 665 1609/1358
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
Co-ordinator: Sisiphiwo Dingana
Cell: 073 715 8450

Knysna Beekeepers' Association
Co-ordinator: Owen Willians * Knysna, Garden Route
Cell: 078 724 6425 * Email: honeychildhoney2@gmail.com

KwaZulu-Natal Bee Farmers' Association
Chairman: Phil Walker * Pietermaritzburg, KwaZulu- Natal
Cell: 084 510 1556 * Email: gdahoney@sai.co.za

Mpumalanga Beekeeping Interest Group
Co- ordinator: Inge Lotter * Nelspruit, Mpumalanga
Cell: 082 821 5011 * Email: inge.lotter@gmail.com

Northern Cape Bee Interest Group
Co- ordinator: Douglas Bee Farms * Douglas, Northern Cape
Cell: 053 298 1101 * Email: dbf@vodamail.co.za

Northerns Beekeepers' Association
Chairman: Jan Steenkamp* Cell: 076 061 3700
Communications: Riekie van den Berg * Pretoria, Gauteng
Cell: 082 972 1889 * Email: justrie@mweb.co.za

Eastern Cape Interest Group
Co- ordinator: Lea- Anne * Port Elizabeth, Eastern Cape
Email: info@artandcraft.co.za

Southern Cape Bee Industry Association
Chairman: Andre de Jager * Email: andredjager@vodamail.co.za
Co- ordinator: Hannes van Zyl * George, Southern Cape
Cell: 082 922 6756 * Email: suidkaapbye@gmail.com

Southerns Beekeeping Association
Chairman: Kai Hichert * Johannesburg, Gauteng
Cell: 082 561 0346 * Email: hichert@worldonline.co.za

Western Cape Bee Industry Association
Chairman: Tlou Masehela * Cape Town, Western Cape
Cell: 078 285 2553 * Email: info@wkbv.co.za

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

MacBee Honey

www.macbeehoney.co.za

MacBee

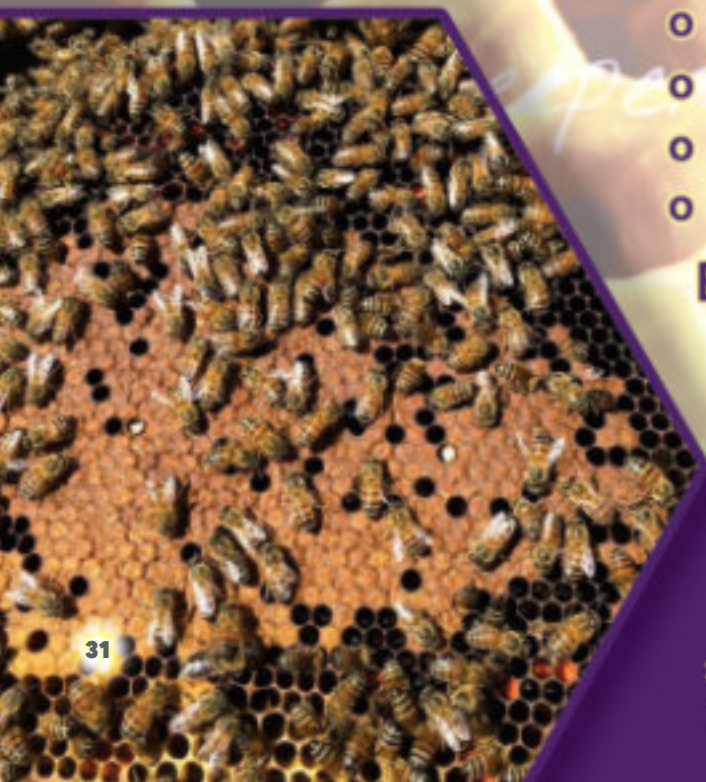
DAFF Registration Number: GP072

100% Raw
Nothing Else

Beekeeper Training Courses:

- Introductory Course – Two days
  Theory & Practical:
  - Getting started
  - Inside the Hive
  - How and when to harvest honey
  - Legislation
  - Beehive components
  - Catching and Installing a swarm
- Intermediate Course – Three days
  Theory & Practical:
  - Setting up an Apiary
  - Spring and Winter Maintenance
  - Harvesting and Processing
  - Hive Management
  - Equipment
  - Pollination Services
  - Record Keeping

Courses conducted in Johannesburg and KwaZulu Natal



Bee Awareness Talks:

for Schools, Youth and Adult Interest Groups

Contact: Landline - 011 802 4343
Sharon Lage - 083 449 8980
macbeehoney@gmail.com
146 Western Service Road, Woodmead 2157
https://www.facebook.com/macbeehoney/

Papers of Interest

Science of the Total Environment 695 (2019) 133833

Contents lists available at ScienceDirect

Science of the Total Environment

journal homepage: www.elsevier.com/locate/scitotenv

Discussion

Risk to pollinators from anthropogenic electro-magnetic radiation (EMR): Evidence and knowledge gaps

Adam J. Vanbergen [a,e,*], Simon G. Potts [b], Alain Vian [c], E. Pascal Malkemper [d], Juliette Young [a,e], Thomas Tscheulin [f]

[a] Agroécologie, AgroSup Dijon, INRA, Univ. Bourgogne Franche-Comté, F-21000 Dijon, France
[b] Centre for Agri-Environmental Research, School of Agriculture, Policy and Development, Reading University, RG6 6AR, UK
[c] IRHS, Université d'Angers, Agrocampus-Ouest, INRA, SFR 4207 QuaSaV, 49071 Beaucouzé, France
[d] Research Institute of Molecular Pathology (IMP), Campus-Vienna-BioCenter 1, 1030 Vienna, Austria
[e] Centre for Ecology & Hydrology, Bush Estate, Penicuik, Edinburgh EH26 0QB, UK
[f] Department of Geography, University of the Aegean, University Hill, GR-81100, Greece

HIGHLIGHTS

- Anthropogenic electromagnetic radiation (light, radiofrequency) is perceived to threaten pollinators and biodiversity.
- Potential risks are artificial light at night (ALAN) and anthropogenic radiofrequency electromagnetic radiation (AREMR).
- We assessed the quantity and quality of evidence, and the level of consensus, to distil key messages for science and policy.
- ALAN can alter pollinator communities and functions, although this remains to be well established.
- Evidence of AREMR impacts is inconclusive due to a lack of high quality, field-realistic studies.
- Whether pollinators and pollination face a threat from the spread of ALAN or AREMR remains a major knowledge gap.

GRAPHICAL ABSTRACT

article info

Article history:
Received 25 June 2019
Received in revised form 2 August 2019
Accepted 6 August 2019
Available online 07 August 2019

Editor: Henner Hollert

abstract

Worldwide urbanisation and use of mobile and wireless technologies (5G, Internet of Things) is leading to the proliferation of anthropogenic electromagnetic radiation (EMR) and campaigning voices continue to call for the risk to human health and wildlife to be recognised. Pollinators provide many benefits to nature and humankind, but face multiple anthropogenic threats. Here, we assess whether artificial light at night (ALAN) and anthropogenic radiofrequency electromagnetic radiation (AREMR), such as used in wireless technologies (4G, 5G) or emitted from power lines, represent an additional and growing threat to pollinators. A lack of high quality scientific studies means that knowledge of the risk to pollinators from anthropogenic EMR is either inconclusive, unresolved, or only partly established. A handful of studies provide evidence that ALAN can alter pollinator communities, pollination and fruit set. Laboratory experiments provide some, albeit variable, evidence that the

* Corresponding author at: Agroécologie, AgroSup Dijon, INRA, Univ. Bourgogne Franche-Comté, F-21000 Dijon, France.
E-mail addresses: adam.vanbergen@inra.fr (A.J. Vanbergen), s.g.potts@reading.ac.uk (S.G. Potts), alain.vian@univ-angers.fr (A. Vian), pascal.malkemper@imp.ac.at (E.P. Malkemper), jyo@ceh.ac.uk (J. Young), t.tscheulin@geo.aegean.gr (T. Tscheulin).

https://doi.org/10.1016/j.scitotenv.2019.133833

nature COMMUNICATIONS

ARTICLE

https://doi.org/10.1038/s41467-020-15919-0 OPEN

Chronic bee paralysis as a serious emerging threat to honey bees

Giles E. Budge [1✉], Nicola K. Simcock [1], Philippa J. Holder [1], Mark D. F. Shirley [1], Mike A. Brown [2], Pauline S. M. Van Weymers [3], David J. Evans [3] & Steve P. Rushton [1]

Chronic bee paralysis is a well-defined viral disease of honey bees with a global distribution that until recently caused rare but severe symptomatology including colony loss. Anecdotal evidence indicates a recent increase in virus incidence in several countries, but no mention of concomitant disease. We use government honey bee health inspection records from England and Wales to test whether chronic bee paralysis is an emerging infectious disease and investigate the spatiotemporal patterns of disease. The number of chronic bee paralysis cases increased exponentially between 2007 and 2017, demonstrating chronic bee paralysis as an emergent disease. Disease is highly clustered spatially within most years, suggesting local spread, but not between years, suggesting disease burnt out with periodic reintroduction. Apiary and county level risk factors are confirmed to include scale of beekeeping operation and the history of honey bee imports. Our findings offer epidemiological insight into this damaging emerging disease.

[1] School of Natural and Environmental Sciences, Newcastle University, Newcastle upon Tyne, Tyne and Wear NE17RU, UK. [2] National Bee Unit, Animal and Plant Health Agency, Sand Hutton, York YO411LZ, UK. [3] Biomedical Sciences Research Complex and School of Biology, University of St Andrews, North Haugh, St Andrews, Fife KY16 9ST, UK. ✉email: giles.budge@newcastle.ac.uk

Honey bee virus causes context-dependent changes in host social behavior

Amy C. Geffre[a,1,2], Tim Gernat[b,c,1], Gyan P. Harwood[d], Beryl M. Jones[e], Deisy Morselli Gysi[c,3], Adam R. Hamilton[b], Bryony C. Bonning[f], Amy L. Toth[a,g], Gene E. Robinson[b,d,h], and Adam G. Dolezal[d,4]

[a]Department of Ecology, Evolution, and Organismal Biology, Iowa State University, Ames, IA 50011; [b]Carl R. Woese Institute for Genomic Biology, University of Illinois at Urbana–Champaign, Urbana, IL 61801; [c]Faculty of Mathematics and Computer Science, Department of Computer Science, University of Leipzig, 04109 Leipzig, Germany; [d]Department of Entomology, University of Illinois at Urbana–Champaign, Urbana, IL 61801; [e]Program in Ecology, Evolution, and Conservation Biology, University of Illinois, Urbana–Champaign, IL 61801; [f]Department of Entomology and Nematology, University of Florida, Gainesville, FL 32611; [g]Department of Entomology, Iowa State University, Ames, IA 50011; and [h]Neuroscience Program, University of Illinois at Urbana–Champaign, Urbana, IL 61801

Edited by Joan E. Strassmann, Washington University in St. Louis, St. Louis, MO, and approved March 16, 2020 (received for review February 6, 2020)

Anthropogenic changes create evolutionarily novel environments that present opportunities for emerging diseases, potentially changing the balance between host and pathogen. Honey bees provide essential pollination services, but intensification and globalization of honey bee management has coincided with increased pathogen pressure, primarily due to a parasitic mite/virus complex. Here, we investigated how honey bee individual and group phenotypes are altered by a virus of concern, Israeli acute paralysis virus (IAPV). Using automated and manual behavioral monitoring of IAPV-inoculated individuals, we find evidence for pathogen manipulation of worker behavior by IAPV, and reveal that this effect depends on social context; that is, within versus between colony interactions. Experimental inoculation reduced social contacts between honey bee colony members, suggesting an adaptive host social immune response to diminish transmission. Parallel analyses with double-stranded RNA (dsRNA)- immunostimulated bees revealed these behaviors are part of a generalized social immune defensive response. Conversely, inoculated bees presented to groups of bees from other colonies experienced reduced aggression compared with dsRNA-immunostimulated bees, facilitating entry into susceptible colonies. This reduction was associated with a shift in cuticular hydrocarbons, the chemical signatures used by bees to discriminate colony members from intruders. These responses were specific to IAPV infection, suggestive of pathogen manipulation of the host. Emerging bee pathogens may thus shape host phenotypes to increase transmission, a strategy especially well suited to the unnaturally high colony densities of modern apiculture. These findings demonstrate how anthropogenic changes could affect arms races between human-managed hosts and their pathogens to potentially affect global food security.

Proceedings of the National Academies of Science (USA).
www.pnas.org/cgi/doi/10.1073/pnas.2002268117

This paper describes an experiment in which worker behaviour is influenced by a viral infection. In the home colony infected workers had reduced contact with their nestmates, while the infected worker seemed to gain easier access to foreign colonies

THE BLUEBERRIES AND THE BEES

Written by Alison McAfee from the Foster Lab, Michael Smith Laboratories, University of British Columbia, Canada.

Thousands of honey bee colonies arrive in the Fraser Valley's blueberry fields every spring, but beekeepers are worried this crop may be harming their bees.

" So, while concerns over bee health in blueberries have been voiced before, this is the first time it has been investigated at such a large scale. So far, whether there is a significant difference in disease incidence between blueberry pollinating and non-pollinating colonies is unknown. That's what we hope to find out, and if so, what we can do about it. To get a head-start on addressing the latter, we are not only measuring the health of colonies in and out of blueberries, we are also testing if Wardell's MegaBee pollen patties can improve colony outcomes in a large-scale, industrial setting, whether the blueberry-pollinating colonies are more EFB-afflicted or not. After all, pH might not be the only benefit of using a pollen supplement."

Alison McAfee began researching honey bees in 2013 as a biochemistry undergraduate student at the University of British Columbia, where she is currently pursuing a PhD. She became enchanted with the little ladies and is pursuing a degree in genome sciences and technology, specializing in hygienic behavior and its underlying mechanisms. In 2017, she received the Canadian Association of Professional Apiculturists Student Merit Award – a recognition that honours outstanding achievements in honey bee research and extension. Email her: alison.mcafee@alumni.ubc.ca and check out her blog: www.alisonmcafeeblogs.wordpress.com

HONEY & THE JAR

Perfectly Made for Each Other

Consol®

The best things come in glass