



A Synopsis of Crimes in the South African Beekeeping Industry: Contextualising the Industry Harms, Malpractices, and Risks

Lindi Hendricks

Stellenbosch University, South Africa

Tlou Masehela

Department of Forestry, Fisheries and the Environment, South Africa

Abstract

Honeybee species have received widespread attention of late, concerning various threats and criminal activity within the industry. As beekeeping involves human–environment interactions, it is situated at the interface between the human social system and the ecosystem. This is primarily owing to the role of pollination in regulating the ecosystem and its implications for global food security. Seed dispersal is also important for biodiversity conservation and environmental sustainability. However, capitalistic economic drivers continue to mismanage natural resources, threatening beekeepers, and honeybee species. This article sheds light on two major issues in the beekeeping industry in South Africa: hive theft and vandalism, and malpractices related to eco-labelled honey. It discusses these as instances of green crimes and provides insights into their implications.

Keywords: Beekeeping; honey; green criminology; food security; biodiversity.

Introduction

Crime in South Africa is a major news and policy issue. According to the World Population Review (2023), the crime rate in South Africa is ranked third highest in the world. The BBC has statistically compared South Africa to a war zone in terms of its murder rate (BBC Reality Check team 2018). However, there is little attention given to crimes and harms related to the environment and nonhuman animals (Brisman and South 2018), even though humans depend on the environment for their survival. Environmental crime, in particular, is an under-researched topic in political science and international relations in Sub-Saharan Africa (Lambrechts 2016).

Green criminology has emerged as a distinct discipline within criminology and has been in existence for over two decades (Lynch and Long 2022). However, its growth has been more significant in the global North than the South. In Africa, the most common cases studied are related to natural resource extraction, forestry, and wildlife. The cases include poaching, bushmeat trade, illegal mining, fracking, hazardous waste pollution, logging for the international timber trade, and environmental degradation. All of these issues pose a threat to livelihoods and lead to conflicts (Sigsworth 2022). The study of these issues is crucial in understanding the impact of environmental crimes on society. The term ‘crime’ and the study of green criminology in South Africa are, however, used in a very conventional, common-law sense—equivalent to criminal offences defined by law. This is problematic in that it limits addressing not only a diverse array of harms and crimes that affect humans, but also how ecological harms affect nonhuman animal species (White and Heckenberg 2014).



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While elements of this article focus on common law, it further touches on viewing crime critically, from a social harm perspective. For example, the article notes that capitalism, the corporation, and unsustainable economic growth impact beekeepers and honey bottlers (Hendricks 2021; Masehela 2017). This causes them to reduce quality as a cost-saving and competitive measure (Hendricks 2021; Masehela 2017).

Crimes concerning beekeeping and honey harvesting have been covered in media channels such as the *Sunday Times Magazine* and *Daily Maverick* newspaper (Jackman 2023; Knowler 2021) and within governmental departments (Department of Agriculture Fisheries and Forestry 2020; Department of Agriculture, Land Reform and Rural Development 2021). This coverage reveals issues such as food fraud and common offenses in the occupation of beekeeping. The crimes of relevance here include hive theft and vandalism that threatens the trade, as well as eco-label malpractices that infringe statutory law. Environmental standards, or eco-labels, particularly those premised on International Standards, ISO 14024 (2018), and ISO 14025 (2006) require third-party certification audits by an accredited certification body. Both standards (ISO 14024:2018 and ISO 14025:2006) are supplementary to, and form part of the ISO 14000 family of standards. ISO 14001:2015 Environmental management systems, the “parent” of the environmental management system standards, stipulates that compliance obligations (legal) are to be met for organizations (European Committee for Standardization 2015). This means that organisations such as manufacturing, production, or processing sites are required to be legally compliant to receive certification, and not infringe statutory law.

Literature Review

Studies of criminal activity in the context of the South African beekeeping industry are limited in academic literature (Masehela 2017; Hendricks 2021). Current data is also limited and relatively undocumented in terms of crimes in the industry. This lack of data (in both academia and industry) is significant because it weakens natural resource management, and biodiversity conservation.

The South African media have recently reported various malpractices in the beekeeping industry. Similar challenges associated with criminality in the industry have been documented, such as honey adulteration, hive theft, and vandalism. These challenges are not only limited to South Africa, but occur internationally, driven by demand, profiteering, and competition. The recent attention paid to the South African honey supply chain and the beekeeping industry stems from public and beekeeper concerns around honeybees and their derived products. However, there has similarly been media coverage in the global North, reporting population declines of bee species, and mass scale honeybee heists, highlighting the threatened status of bees (Goulson et al. 2015). In South Africa, concerns include the provenance or origins of honey that is sold, harvesting claims, adulteration, and production deficits (Kings 2015; Knowler 2021). Literature also refers to the damage done by hive theft, vandalism, beekeeper conflict with honey badgers (*Mellivora capensis*), and droughts affecting forage for managed hives (Hendricks 2021; Masehela 2017; Begg, C 2001). The gravity of these concerns deeply resonates with food security, environmental sustainability, and the importance of bees and beekeeping globally. The contribution of beekeeping to agricultural crop pollination is at the nexus of food security and nutrition (Food and Agriculture Organization of the United Nations [FAO] 2018; Khalifa et al. 2021).

Most research in South Africa has focused on various honeybee stressors and diseases. However, there appear to be no focused studies exploring criminal elements across the beekeeping supply chain (from the hive to the bottler), and the harm that they are causing the industry at large. The majority of the crimes are reported in mainstream journalistic media and have not been extensively researched in terms of their mechanism of operation and the quantity of the losses. The available literature on the South African honeybee and the beekeeping industry has, however, assisted in understanding the complexities of environmental management systems, within the supply chain and harvesting of honeybee products.

Ecologically, loss of bees results in a loss of biodiversity, owing to reduced pollination which, in turn, affects food security. Honeybees are indirectly integral for job creation within the agricultural sector (Puttergil Masehela and Fuller 2022), which supports livelihoods and society at large. The difficulties beekeepers and the industry encounter, hinder optimal operation of a successful beekeeping business for honey production, manufacturing of honeybee-related products, and the rendering of pollination services in agriculture businesses. As a result, livelihood income is also at risk and becomes highly unsustainable, particularly for commercial beekeepers. Beekeeping and honey harvesting have been monopolised and developed into a lucrative industry in most parts of the world, particularly for pollination services (Degrandi-Hoffman et al. 2019) and bee-related products (Dafar 2018). Ecosystem services such as pollination is necessary to ensure food security and address world hunger. However, bees (and other pollinators) continue to face ecological threats and stressors, including the effects of habitat destruction and loss, pests, pathogens, poor nutrition, diseases, viruses, pesticides, pollination stress, and climate change-related impacts (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services 2016). This is in addition to anthropogenic threats and stressors, such as vandalism, hive theft, and food fraud.

Methods

The research approach for previous studies (Hendricks 2021; Masehela 2017) included qualitative and quantitative methods. The quantitative portion of the first author's (Hendricks 2021) study was intermittently generated using an online Google Forms survey. The survey included a 5-point Likert scale, dichotomous questions, checkbox and multiple-choice questions, open-ended and closed-ended questions, and picture choice questions. The data was then analysed qualitatively to address broader issues raised in the study. This comprised a desk study and literature review. Fieldwork was undertaken by both authors. The first author's data also included semi-structured key informant interviews and market research to identify all the eco-labels found on honeybee products. Key informant interviews were undertaken intermittently over a period of two quarters (last quarter 2019 to first quarter 2020) in the Eastern and Western Cape provinces of South Africa. The sampling approach was both voluntary—beekeepers who were willing to participate in the study—and purposive—deliberate selection of suitable participants who would aid in meeting the aim and objectives of the study. The interviewees included the Agricultural Research Council (ARC), a beekeeper trainer, the owner of an apitourism establishment, and well-known generational beekeepers. The ARC also enabled hardcopies of meeting minutes from the 1990s to early 2000s, and access to documents relating to the inception of the Badger-Friendly honey eco-label. All the research participants were anonymised, and codes were given in place of their names in the study (i.e., key informant 1/survey respondent 2).

For the second author, the data collection approach included distributing hardcopies of questionnaires to beekeepers in two languages—English and Afrikaans—by postage paid. The *South African Bee Journal* (Volume 83 No. 4) was the selected media used to disseminate information about the survey. The *South African Bee Journal* is published on a quarterly basis and is distributed to all registered South African Bee Industry Organisation (SABIO) members. The questionnaire comprised four questions specifically relating to theft and vandalism. Basic descriptive statistical methods were used to present the results of the data. The relative number of colonies (total for beekeepers) at a provincial level were deduced. Online questionnaires were also distributed to two South African beekeeper Google groups, named 'BeeSAGoogleGroups' and 'ApicultureSA'. Both Google groups have large followings and are well represented countrywide. Oral presentations were also given to promote the questionnaire at the meetings and conferences of notable beekeeper associations (Masehela 2017), such as the SABIO Bee Conference. The final bid to ensure a positive response rate was in the form of direct telephonic correspondence.

As part of the research, the first author conducted an online survey using Google Forms. Questionnaires and surveys were used to meet the study's objectives and to understand the practical aspects of honey eco-labels. It was crucial to collect data through in-depth investigation into beekeeping procedures and practices in South Africa. The surveys were also distributed using the Google Group of Apiculture SA.

The research participants in the first author's data collection (Hendricks 2021) were unwilling to disclose the exact locations of their apiary sites, so the closest towns and cities were used as a point of reference. Beekeepers are largely dependent on landowners for apiary sites in South Africa, as only a nominal percentage of beekeeping occurs on land owned by beekeepers. Beekeepers were also unwilling to share exact details of the sites. They preferred to keep their sites secret, to prevent other beekeepers encroaching on their territory which might result in hive competition for forage. Also, when locations of the hives are known, they become an easy target for theft and vandalism. In some instances (based on interviews with beekeepers), beekeepers fear those other competitors negotiating for better incentives and rewards with the landowners. This can result in the loss their favourable or productive apiary site. Honeybee crimes, such as hive theft and vandalism, were raised by many beekeepers as commonly occurring incidents. This was a hindrance in understanding the exact geography of the apiary sites in terms of climate, forage, and the honey's origins.

The questionnaires and surveys were distributed nationally by the first and second authors, targeting all South African beekeepers, irrespective of their registration classification. Neither author received a 100% response rate. South African beekeepers are notorious for secrecy regarding their practices. This is mainly due to theft, forage competition (sites) and non-compliance in terms of registration with the Department of Agriculture, Land Reform and Rural Development (DALRRD). The fieldwork conducted by both authors employed mixed methods in questionnaire designs and distribution as well as interview processes. This approach was seen as the best way to reach and capture participants as widely as possible, given that studies of this manner are known not to have a good response or return ratio (Sivo et al. 2006; Wu, Zhao and Fils-Aime 2022). Additionally, it was expected that the level of understanding of certain elements of the questionnaire or interview process would differ across participants (Bless, Higson-Smith and Kagee 2007). In other cases, some respondents might choose not to answer questions correctly or not be entirely honest with their answers (Bryman 2012). All these elements are difficult to counter or even verify, especially when it comes to the data collection. Hence, they can also serve as major drawbacks, if not weaknesses, for questionnaire-based studies. In this case, it was important to take the mixed methods approach to counter these drawbacks.

All ethical considerations were submitted to Stellenbosch University's Research Ethics Committees (Humanities and Science) for approval. The Stellenbosch University (Humanities and Science) Consent form for data collection and informed consent, as well as the Stellenbosch (Humanities and Science) Request for data sharing and permission was issued at the commencement of all communication and correspondence to potential participants. Respondents were asked to acknowledge and sign the university's these ethical clearance forms, containing all the necessary information and contact details, for consent to participate in the study.

Primary and Secondary Harms

Green criminology considers ecosystems and components of ecosystems as living entities. Primary harms to ecosystems are considered a form of victimisation of the natural world (White and Heckenberg 2014). Ecosystem harms also have secondary effects on species that live within an ecosystem, beyond humans, but also have political economic dynamics. To this effect, some forms of harm and damage to the environment may include the impacts of hive theft, vandalism, and the misdeeds of eco-label applications. These harms can have significant implications for the cultivation of nutritional food crops (non-staple crops) and the distribution of food necessary for food security, as well as the loss of honeybee species (Croall 2012). Three quarters of global crop production relies on insect pollination, of which the majority is performed by honeybees. This, in turn, has a chronic effect on the three pillars of sustainability: society, the environment, and the economy. Therefore, the ecological aspect of insect pollination is vitally important for biodiversity conservation, supporting crop diversity, providing nutritional requirements, and for overall food security.

South African Beekeeping Industry Role Players

Green criminology draws attention to a much broader array of victims than traditional forms of criminology would usually address (Lynch and Long 2022). This is appropriate for discussion about the beekeeping industry in South Africa, situated between the socio-economic system and the ecosystem. This position provides context demonstrating that it is rarely beekeepers, rather other actors within the industry, that are involved in fraudulent or harmful activities. There are several stakeholders in the South African beekeeping industry and not all of them are beekeepers. As South (2014) suggests, harms and damages can be felt immediately or only in the long-term and may be 'direct or indirect'. Their causes may arise in many different ways and those responsible might be individuals, groups, corporations, governments, or criminal enterprises.

In South Africa, any person who keeps, owns, or is in charge of a colony of honeybees whether commercial, hobbyist or as a bee removal service provider, is legally required to annually register with the Department of Agriculture, Forestry and Fisheries as a beekeeper. This is in accordance with the control measures cited in the *Agricultural Pests Act 1983*, s. 36. Initially, the Department was DAFF (Department of Agriculture, Forestry and Fisheries) when the registration process was first introduced. It has since changed (in 2019/20) to the Department of Agriculture, Land Reform and Rural Development (DALRRD).

The industry can be defined in terms of its stakeholders, which comprises beekeepers, honey bottlers, farmers, and pollination brokers respectively. Firstly, there are beekeepers, who actively manage hives, harvest, and produce honey and other bee-related products and provide pollination services at a set fee. Secondly, there are honey bottlers (commonly known as bottlers), who may be beekeepers, or simply purchase bulk honey from other beekeepers to process in their bottling facilities. In most cases, it is the bottlers who have lucrative contracts with various retailers for honey sales. This is because their facilities for honey processing are often of a good standard with recordkeeping systems that are acceptable to the retailers, fulfilling some of the eco-labelling requirements. This is, conversely, also where issues regarding legitimacy in environmental certification arise, as apparent in Hendricks's (2021) paper concerning issues with transparency. Here it was evident that some honey suppliers were procuring and shipping in honey from multiple sites, revealing only their logistical side of the incoming honey, and the related manufacturing process. Then bottling, labelling, and selling it as a local product, not disclosing the exact origins of the honey, or location of the hives. Thirdly, farmers (growers) farm different crops and keep bees for either honey production or for pollination services. Fourthly, pollination brokers—while not formally identified as primary actors in the beekeeping landscape—source pollination hives and set up pollination contracts between farmers and beekeepers. These brokers often dictate and/or manipulate the prices of pollination per hive (pollination unit) that beekeepers can charge farmers. They receive a commission as a percentage of the agreed pollination fee for the transaction. Lastly, and most importantly, is the honeybee and their complex division of labour and hierarchical hive system.

Hive Theft and Vandalism

Masehela (2017) identifies hive theft and vandalism as key contributors to colony losses, threatening beekeeping activities (including the related services) and beekeeper livelihoods. Honeybees play an important role as pollinators, particularly for commercial agriculture, and contribute to beekeeper livelihoods through trading honey and other honeybee products. This

research also found the knowledge element regarding colony losses to be limited in terms of data availability trends, stating that the extent of impact is that of theft and vandalism. Hive theft and vandalism have multiple catalysts. These include sabotaging for pollination contracts, using stolen hives for pollination, using any material that can be salvaged for the thief's own boxes, and theft of honey for sales and personal gain.

Masehela (2017) distinguishes three types of colony theft: removal of the entire hive (box, bees, and honey), removal of honey only (bees and hive remain), and removal of honey and bees (only hive box remains). Vandalism in beekeeping refers to the partial or complete destruction of the hive where the box, bees, and honey are forfeited. The reasons for human vandalism relate to theft and eliminating competition with other beekeepers. Predators, such as honey badgers and baboons, also raid hives for bee larvae, which can be classified as a form of hunting or predation vandalism. Foraging bees and their hives are also subject to attack by predators such as wasps, ants, and beetles. However, in Masehela (2017) and the current study, all acts of hive theft and vandalism are attributed to humans as animal damage cannot be classified as vandalism. Recent forms of vandalism could be classified as 'mischief', tending to escalate during school holidays and being attributed to school children, and mostly occurring on farm properties and communal land. This often results in destruction of the entire hive or even uncontrolled fires that cause great destruction to vegetation and infrastructure. These observations and reports were very common across WhatsApp group communications within the Western Cape Bee Industry Association. Perhaps predictably, these acts seem to have escalated during the COVID-19 lockdown period, where most children were not going to school on a regular basis. Beekeepers who opened cases of theft and/or vandalism with the South African Police Services (SAPS) also indicated that most apprehended offenders were minors. These perpetrators were later released to their parents or guardians with only a warning not to commit the same or similar crime.

The South African beekeeping census of 1974/5 was the first report to comprehensively detail the impact of hive theft and vandalism in South Africa (Anderson 1978). The South African beekeeping census of 1974/5 reported that 3440 (5.7%) hives were lost to theft and vandalism of colonies annually (Anderson 1978). The cost of losses was estimated to be 93 032 South African Rands (US\$5060.46 at the time of writing in November 2023), based on R27.04 per hive (US\$1.47 at the time of writing). At the time, most vandalism (act of destruction) was attributed to honey badgers (*Mellivora capensis*), while theft was directly attributed to humans. The census report also highlighted theft to be a leading concern for beekeepers across the country, even though agricultural chemicals were a major contributor to hive loss at the time—estimated at 7.1% (4271) (Anderson 1978). In 1982, another industry survey was conducted, focusing on honeybee pests in South Africa (Buys 1982). The survey had a total of 185 (23%) respondents, from the distributed 850 questionnaires, while the number of hives constituted by the respondents was not given. Theft was reported by 22 respondents with 68% indicating it to be a 'serious' problem, whereas the remaining 23% and 9% indicated it to be a 'rather serious' or 'not serious' problem, respectively.

The last official reporting on bee-related theft and vandalism in South Africa, before Masehela (2017), was produced as part of the *National Agricultural Marketing Council (NAMC) Annual Report* (2008), commissioned by the Minister of Agriculture. Similar to the census survey, the NAMC Report indicated that theft and vandalism was among the top five most concerning issues for beekeepers countrywide. In particular, hive theft and vandalism threatened the use (and potential thereof) of areas with good forage for beekeeping. Currently, theft and vandalism reports are part of the daily conversations in different beekeeping platforms, namely Google groups ApicultureSA and BeesSA, respective provincial beekeeping association WhatsApp groups, and special beekeeping groups (i.e., crop pollination and technical chat groups).

Almost all beekeeping activities in South Africa take place on land not owned by a beekeeper. This means that the beekeeping sites (apiary) are mostly far from the beekeeper's domicile—out of sight for close monitoring. The choice of where to place hives is very limited, so beekeeping activities are often pushed to marginal land, making them prone to theft or vandalism as they become difficult to monitor and protect. This makes theft and vandalism of hives, commercial or otherwise, a major risk factor for any beekeeping business. In most instances, the efforts to manage this risk can become costly for beekeepers. At the same time, it is a general belief among beekeepers that respective law enforcement agencies do not recognise or understand the seriousness and severity of the problem and its impact on the industry.

Honey Adulteration: Pure Honey, Raw Honey, Monofloral Honey, and Wild Honey

Fraudulent food enhancement, such as honey adulteration, describes a situation where wholefood is value enhanced through deceitful cost-cutting measures (Gussow and Mariët 2022). These cost-cutting measures support the functioning of the capitalist system which pressures producers to undercut the market for a competitive advantage. This is to support the agricultural manufacturing supply chain, by enabling cheaper production processes for a higher yield. Food fraud is a criminal intent motivated by economic gain to adulterate or misrepresent food ingredients and packaging (Jurica et al. 2021). Food fraud is

committed by any actor who is intentionally involved in illegal acts for economic advantage, thus causing or facilitating illegal food to be laundered into the supply chain, or for food to be fraudulently value enhanced (Gussow and Mariët 2022).

There are two types of food adulteration: intentional or deliberate adulteration by dishonest producers, retailers, and processors for financial upliftment; and incidental or unintentional adulteration which may be done at the time of producing, handling, or storing (Thangaraju, Modupalli and Natarajan 2021). Food adulteration has a negative impact on producers, farmers, consumers, enterprises, and government. The main challenges, according to Ayza and Belete (2015), are related public health problems, lack of acceptance in the market owing to lack of originality and decrease in consumer confidence. As one of the key resources necessary for sustaining life, food is also subject to similar legal but morally dubious, deviant, and, criminal forms of manipulation, and exploitation as other products of the planet (Croall 2012). Consumers can be poisoned by everyday foods, defrauded by counterfeit products, and misled by a host of marketing practices (Croall 2007).

The focus of adulteration and what it means in terms of food labels can be narrowed. The most common adulterants used in honey include cane sugar, high fructose corn syrup, inverted sugar, and corn syrup (Elflein and Raetzke 2008). On honey labels in South Africa, these include 'Raw honey', 'Pure honey', 'Monofloral' honey, and 'Wild honey'. 'Raw honey' is defined in the *Agricultural Products Standards Act 1990*, s. 119 as unfiltered and unheated honey. In essence, this means that honey is in its closest to natural state, which may contain fine particle, pollen grains, air bubbles, honeycomb, and propolis found in suspension. This complies with the specifications of how Choice Grade liquid honey is processed. There are two grades of honey stipulated in the legislation: Choice and Industrial Grade. The grading is used to determine the composition, quality, and ripeness of honey, as the legislation states that there shall be no grading of raw honey for honey and mixtures of bee products. Pure honey is accepted to mean that it is one hundred percent (100%) pure without additives. Although the definition is not gazetted in the overarching *Agricultural Products Standards Act 1990*, s. 119 the term 'additives' is listed in the definition of the Act to mean food additives. Additionally, the definition refers to the *Foodstuffs, Cosmetics and Disinfectants Act 1972*, s. 54 for further definitions of food additives. Careful attention must be paid to the country of origin of the contents, as well as the name and business address of the producer, as this could potentially speak to the likelihood for impure or adulterated honey. These labels bear implications for honey quality as the presence of additives would mean that it was not pure honey. Additionally, if honey has undergone industrial heating processes it cannot be labelled as 'Raw honey'.

Floral honey is defined in the *Agricultural Products Standards Act 1990*, s. 119 as any laevorotatory honey derived essentially from the nectar of flowers. 'Monofloral', therefore, refers to honey derived from a nectar source of a single or particular plant species—the predominant forage. In this instance, labels on the honey packaging refer to the nectar sources contributing to the honey flavour and aromatics, more so than the sweetness. This is generally a consumer preference in taste. When adulterated, the sugar content is higher, thus reducing the flavour profile and ultimately affecting the taste and nutritional value of the honey. Monofloral is not gazetted nor part of any convention in South Africa, particularly in terms of the ratio or percentage of the main floral source. This open-endedness makes it easy to misrepresent the honey's properties and enables false claims and adulteration. This provides no basis for guarantee or guard against adulteration, suggesting that it could be occurring similarly in the cases of 'Pure' and 'Raw' honey. Consumers are unaware of this and rely on what the bottler or beekeeper is labelling the honey. For example, if it is called 'Citrus blossom', consumers may believe that bees forage on 'citrus nectar'. In contrast to monofloral honey, multifloral or wild honey is sourced from several botanical flowers, with none of them predominant. Classified in this category, wild honey is sold as forest, wildflower, wild hive, multiflora, or simply wild honey.

The *Agricultural Product Standards 1990*, s. 119 administers the grading, packaging, and marking of honey and mixtures of bee products intended for sale in South Africa. The Act makes it clear that no wording, illustration, or other means of expression which could constitute a misrepresentation or may create a misleading impression of the content is permitted. This is not permissible on any container with honey or mixtures of bee products. All honey producers are required to comply with the regulations regarding the grading, packaging, and marking of honey and mixtures of bee products intended for sale in South Africa. Further restricted information on containers cited in the Act relates to honey substitutes where labelling and packaging should not include the word 'honey' or any representation of honey. The legislation states that if such honey substitute contains any honey, then the word 'honey' is permitted within the list of ingredients.

South Africa's First Eco-label: Badger-Friendly Honey

Masehela (2017) outlines hunting and predation as problems caused by honey badgers (*Mellivora capensis*) raiding and destroying hives. To mitigate this problem, beekeepers started to use trapping methods such as gin traps (more specifically referred to as steel-jaw leghold traps), which clamp the leg of the badgers causing the amputation of limbs (Begg, K 2001a). This is a cruel and unethical practice to deter honey badgers from beehives. Yet, it is widely used by beekeepers as it is amongst

the cheapest methods of control, and traps are readily available across the market. In South Africa, they are also legal (without a permit) for catching caracals, black backed jackals, and stray dogs (Begg, K 2001a).

The vulnerable conservation status of honey badgers was notably documented by Begg, C (2001) whose primary motivation for the study of the honey badger in the southern Kalahari was the lack of fundamental biological information about the animal in southern Africa. Colleen and Keith Begg (2002) are leading authors in the honey badger literature in South Africa. They have spent a considerable number of years researching the interactions between beekeepers and honey badgers to understand their behaviour as well as the human impact on the honey badger population. This includes the beekeeping industry at large. The research led to the formation of the Badger-Friendly eco-label as a conservation measure for honey badgers as beekeepers were found to be a significant threat to their conservation in the Western Cape (Begg, C and Begg, K 2002). The eco-label, an original and uniquely South Africa, aimed at beekeepers and to control honey badgers and guard against honey hive, and resource losses.

Honey badgers are considered to be rare, and existing in low densities throughout South Africa (Kruuk and Mills 1983; Smithers 1986). It is commonly understood that there have been population declines with local extinctions, in areas where badgers were persecuted (Comrie-Greig 1985). Honey badgers also have a slow reproductive rate, and their distribution in South Africa is widespread, but nowhere common.

The Badger Friendly eco-label was endorsed by the Endangered Wildlife Trust (EWT) with an overarching objective to ensure the long-term survival of honey badgers by promoting the use of the eco-label. The EWT is a registered Non-Profit Organisation; it is not accredited nor a certification body. However, the eco-label follows a similar principle to a Type I eco-label (see Introduction for clarity) in that the EWT is the competent authority responsible for conducting the compliance audits and issuing the Badger-Friendly Honey eco-label to beekeepers.

However, according to Hendricks (2021), there are contradictions in the attainment and the implementation of the eco-label, considering the Badger-Friendly label requirements. Here, respondents claimed that some beekeepers were printing their own stickers, and that there were no known cases of rejections or refusals to issue the Badger-Friendly eco-label. Respondents also reported some label holders had not undergone third-party audits in a decade (these should be biennial). The claims made concerning the printing of stickers were observed in this study, together with the absence of third-party audits. To some degree, the concerns raised by respondents relating to the integrity of third-party inspection were therefore valid in this instance. Additionally, aspects of the feasibility of the auditing process were seen as impractical. This was validated as not all the hives at the apiary sites could reasonably be accounted for, and the method of the inspection would therefore be a sample audit or 'merely a paper exercise', as stated by one of the respondents. This was explained in the context of an apiary landscape (commercial scale), where there would be multiple apiary sites (hosting a number of hives) and a separate manufacturing or bottling facility, serving as a common collection point for incoming honey from the producer or beekeeper.

Respondents validated this argument by stating that the honey is only being audited at the supplier's manufacturing facilities, not at all of the producer-beekeeper's apiary sites, due to its impracticality. Others argued that beekeepers work for themselves, and that it is difficult to monitor their beekeepers' social conditions as all their honey is externally sourced. One respondent—a bottler and holder of the Badger-Friendly eco-label—made it known that keeping track of the conditions from where their honey is originating is a difficult task. This could mean that locational masking also creates limitations regarding the effectiveness of the label as a conservation measure, as it does not account for imported honey, and beekeeping conservation methods against predators. Additionally, 'honey by proxy' could mean that adulterated honey is labelled as 'Badger-Friendly'.

Discussion: Derived Harms in the Beekeeping Industry

The application of environmental certification, or eco-labels, and legislated food labels is useful in agriculture to uphold the kind of environmental and social standards that are required in beekeeping and honey manufacturing. The many reasons why this is important include public health problems that many are unaware of, but that might arise from honey adulteration. These may include threatening the health of diabetics to an increase in blood sugar, abdominal weight gain and obesity, raising the level of blood lipids, and high blood pressure (Fakhlai et al. 2020). The most common organ affected by honey adulterants is the liver, followed by the kidney, heart, and brain (Fakhlai et al. 2020). In addition to health concerns, honey is a cachet product, meaning that it comes at a cost, and is therefore profitable to producers and manufacturers. However, when it is adulterated with low-cost sugars and commercial syrups, the quality and chemical composition of honey will be compromised. Reducing the purity of the honey may mean it lacks the beneficial nutrients and medicinal value of authentic (pure) honey (Fakhlai et al. 2020), which is harmful to consumers and society at large if it poses health risks. Honey adulteration does not protect, improve, or promote the declining honeybee population, which has an impact on pollination. Nearly 75% of the world's

crops producing fruits and seeds for human consumption depend, at least in part, on pollinators for sustained production, yield, and quality (FAO 2019). It was observed by Hendricks (2021) that only the small-scale and hobbyist beekeepers demonstrated an inclination to pursue honey authenticity rather than adulteration. In Hendricks (2021) one of the key research informants, described honey as the second most adulterated form of natural produce (after olive oil), and that ‘honey continues to be sold as a product of places where it is not from’. Participants in the study discussed at length how the profile of honey flavour and sugar content is impacted by adulteration. The most common responses overall from the beekeepers about adulteration were that South Africa managed the impossible feat of selling more ‘local honey’ than it produced, and, in fact, South Africa remained a net importer.

Next, we discuss adulteration, theft, and vandalism in the beekeeping industry in the context of green criminology.

Adulteration

Green criminologists and researchers argue that environmental harm is a highly contested concept because much of the actual harm is perceived to be legitimate and lawful (White 2013). White (2013), relatedly, uses the example of animal food production, and how it is achieved through a combination of embedding harmful practices into everyday activities. This involves pervasive propaganda efforts, such as income generation and job opportunities, and manipulation of legislation, such as exceptions that deny animal cruelty provisions being applied to farm animals. Further to White’s examples (2013), includes greenwashing, a deceptive retail practice that result in consumers believing that they are making an environmentally conscious purchase (Shahrin et al. 2017). Greenwashing and deceptive marketing are prevalent in eco-labelling practices as not all eco-related claims are genuine and many consumers want to believe that they are making an environmentally conscious purchase. Noteworthy, as briefed in European Parliament in March 2023 (in the same year at the time of writing) (European Parliament 2023), the European Commission proposed a new directive on “Green claims”, taking action to address greenwashing and protect consumers and the environment (European Commission 2023).

To an extent, this could be applied to the harvesting of honeybee products in the context of honey supply chain activities and eco-labelling practices. The various ways in which information regarding the origins of honey is falsified give rise to problems relating to pathogen exposure, honey adulteration, and bee forage authenticity. To mitigate this, many international standards (including some eco-labels such Rainforest Alliance 2020 and Forest Stewardship Council 2021 *inter alia*) require evidence of chain of custody and traceability audits. In terms of agricultural production these would form part of the environmental standard’s requirements for certification of a farm, or its related production site. For traceability, some environmental standards also factor the lifecycle of the production site, this includes sourcing and procurement of raw materials, distribution, manufacturing, and waste sites in the scope of the environmental management system, as termed “cradle to grave”.

In many countries however, laws regarding adulterated honey, remains unobserved, allowing for the continuation of counterfeit trade. A study undertaken by Hübschle (2017) on transnational flows across national legal jurisdictions, determined the boundaries and limits of legality and illegality in independent states. The research found that, once an economic exchange moves beyond the political boundaries of the state, issues of jurisdiction become unclear and complicated. While government defines what is legal or illegal (Hübschle 2017) there may be a disconnection between the state and society regarding such legal definitions, their interpretation, and the legitimacy of such rules. In the honey trade, this could pertain to honey adulteration, ultimately compromising the integrity of the ingredients, its origins, bee forage, flavour profile, and nutritional value.

To substantiate this, the largest food fraud case in the history of the United States was Honey Holdings I, Ltd v. Alfred L. Wolff Inc (AWL) (Berfield 2013), that involved honey laundering. AWL was importing and blending honey from China and India and falsifying its origins, by tampering with the labels on the shipping containers, during the trans-Atlantic crossing (Berfield 2013). South Africa remains a net importer of honey (Kala 2020) which, alongside high consumer demand, creates optimal conditions for crimes such as adulteration and theft. For example, imports from China (Crouth 2021) are considerably cheaper compared to other countries. This attracts large-scale or commercial beekeepers and bottlers, enabling them to meet the market demands. Consequently, beekeepers can bypass the legal systems in place, enabling adulteration because it remains classified as a premium product.

There have been no reported cases of prosecutions or fines to date regarding beekeeping and honey production in South Africa. Kidd (2004) suggests that, while penalties provided in South African legislation are perhaps adequate, the actual sentences handed down are often not. Various penalties other than fines and imprisonment are then considered, both in South African and other jurisdictions (Kidd 2004).

Hive Theft and Vandalism

In South Africa, hive destruction has often been caused by honey badgers and baboons (Begg, K 2001b). Today, since beekeeping has become a professional business, world-wide, humans are the most significant culprits for hive theft and vandalism. These acts of destruction threaten beekeeper livelihoods and restrict beekeeping activities (Johannsmeier 2001; National Agricultural Marketing Council Report 2008). Hive theft and vandalism influence the use of forage in both natural and agricultural areas and can discourage beekeeping practices in those areas. Safety is a key factor when it comes to the viability and sustainability of beekeeping within South Africa. Beekeepers have invested in some security measures to try and reduce these losses (Begg and Allsopp 2001; Hall 2010; Johannsmeier 2001). Because hive theft and vandalism occur in both natural and agricultural lands, this threatens the normal maintenance of colonies, honey production, and crop pollination. This is arguably as big a threat as the loss of forage. Laws and regulations need to recognise hive theft and vandalism as acts of stock theft or vandalism of personal property (Du Preez 2010). This can also extend to environmental law enforcement, given destruction and loss of managed honeybees has an indirect impact on wild populations.

Conclusion

Honey adulteration is perceived by some as a short-term solution to shortages of pure honey and a way of supporting commercial beekeepers and bottlers economically. Beekeeping and honey production face long-term and sustainability challenges due to poor manufacturing practices. Environmental certification and eco-labels, serve as a mitigatory measure against adulteration, for example (inter alia), EU Organic certification where origins and traceability are critical elements in the environmental standard. A supplementary audit for EU Organic certification includes an inputs approval, whereby certification bodies approve ingredients and chemical compositions as being of natural origins (requiring the expertise of laboratory chemists). If the same principle and method is implemented for beekeeping, this should pressure honey bottlers to prove the authenticity of origins claims.

The penalties, fines, and prosecutions for honey adulteration in South Africa are inadequate. However, there is no obvious panacea for all corporate ills and the closest cases to fair practice in terms of origins, 'chain of custody', and role models come from elsewhere. The Badger-Friendly eco-label marked the start of a conservation movement unique to South Africa. It also brought awareness to the consumer and is a well-intentioned measure for protecting the honey badger and its conservation status. Its effectiveness is, however, inconclusive, not least because the eco-label application procedure does not account for a chain of custody audit to certify honey provenance, being labelled 'Badger-Friendly'.

In the future, landowners must remain vigilant and have suitable agreements with beekeepers to ensure the safety of hives on their property, even though the responsibility for the hives remains that of the beekeeper. A system for landowners to compensate beekeepers if hives are damaged or stolen when rented for pollination, possibly in the form of hive insurance, would be worth exploring for both parties. Until such a time that countering hive theft and vandalism becomes a joint effort between beekeepers, landowners, and law enforcement authorities, it will be an endless battle against perpetrators.

Correspondence:

Lindi Hendricks, Director WildBloom Eco-Label Specialists Pty Ltd, South Africa. lindileela@wbecolabels.co.za
Tlou Masehela, Directorate Biodiversity Risk Management: Biosafety & AIS, Department of Forestry, Fisheries and the Environment, Environment House 473 Steve Biko Road, Pretoria, South Africa. masehelats@gmail.com

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