

Elephants Bees & Trees

Project Manual



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Science & Survival





“We have chosen to fill our hives with honey and wax; thus furnished mankind with the two noblest of things, which are sweetness and light”

Jonathon Swift (1667-1745)

First Printed in 2018

with gratitude to Kiss Me Organics for covering the printing cost



Elephants, Bees, Trees & People

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Science & Survival

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The Africa Honeybee *Apis mellifera scutellata*



The African honeybee is distributed throughout southern and eastern Africa, found most commonly in woodland and grassland savannas. There are three castes or types of African honeybees (queens, workers and drones), each one distinguishable by its morphology and the activities it performs. Each colony has one active queen that is responsible for laying eggs and is one-and-a-half times larger than the workers. Workers, which are females with abnormally developed reproductive organs, are responsible for a number of duties including hive maintenance, brood rearing, pollen collecting, and defence of the colony. Drones are males which have the sole responsibility of mating with the virgin queen. Worker bees usually forage within a radius of 1400 m from their hives, although foraging ranges of up to 6 km have been recorded. In the wild, African honeybees may inhabit tree cavities or earthen cavities, such as rocks or uninhabited termite mounds, with water and resource availability being two major factors driving where colonies nest. African honeybees are also important pollinators of large trees such as knobthorn *Acacia nigrescens* and marula *Sclerocarya birrea*.

Elephants, Bees and Trees *Why the Relationship?*

In 2002, researchers from Save the Elephants first published scientific evidence suggesting that African honeybees may be an effective tool for deterring African elephants from valuable resources (in their case, fever trees *Vachellia xanthophloea*). Building on this research, Dr Lucy King of Save the Elephants' Elephants and Bees Project (www.elephantsandbees.com) has provided evidence that beehives and beehive fence-lines (fences strung with interconnecting beehives) can be used to successfully deter elephants from crop fields, whilst providing farmers with a potential financial and food source - honey. It appears that elephants retain a negative memory about honeybees and the possible dangers associated with the honeybees and their stings. Although crop raiding by elephants is a major form of human-elephant conflict (HEC) in both Africa and Asia, a lesser known HEC situation exists in protected areas where humans are concerned over the impact that elephants have on large iconic tree species. Culling of elephants has been carried out in the past in attempt to lesson elephant impact on large trees. However, the relationship between elephant numbers and the loss of large trees is not linear. Therefore, current management practices focus on managing elephant effects rather than elephant numbers. Mitigation methods are an important tool with regards to managing elephant effects on the environment. As a consequence, Dr Michelle Henley from Elephants Alive (www.elephantsalive.org) has run a large tree monitoring programme in the Associated Private Nature Reserves adjoining the Kruger National Park since 2004 to monitor the effects that elephants have on large trees. Dr Henley's research indicated that wire net protection of experimental versus control trees increased the survival rate of the trees at some sites and were dependent on the type of elephant impact to the tree. The use of beehives offers an alternative method to protect large trees from elephant impact in protected areas, whilst providing both pollination services to the environment, as well as honey production for the protected area involved.





General Information

Essential Equipment Required for Beekeeping

- Bee suits + gloves
- Smoker
- Hive tool
- Plantex (sticky glue substance to prevent ant invasions)
- Respectable Beekeeping Manual

Nectar and Pollen/Protein Supplements





- http://www.beequip.co.za/?page_id=101
- Important for feeding colonies during the dry months of the year
- Nectar supplement

Medical Products

- EpiPen for extreme allergic reactions
- Allergex (anti histamines) for mild reactions
- Valoid for nausea
- Mylocort cream for itching

Supplementary Feeding Program

- During the dry winter months or periods of drought, supplementary feeding is necessary to help maintain and support honeybee colonies.
 - We recommend the following feeding program:
 - 1 cup of pollen per colony per week
(See 'Nectar and Pollen/Protein supplements')
 - Pollen can be placed in a small container from which the honeybees can feed.
 - Nectar and sugar water solution provided to the colonies twice a week.
 - Concentration:
 - 1 cup of nectar solution
(See 'Nectar and Pollen/Protein supplements')
 - 5 cups of sugar (white or brown)
 - 12 litres of boiling water
 - NB: Concentrations and days between feeding can be made stronger and more frequent depending on the number of colonies being fed and the financial logistics.
 - NB: Do not let the nectar and sugar solution ferment as the honeybees will not make use of the solution.
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	Drip System	Chicken Water Feeder	Tin Cans	Water Bottle Ramp
Image				
Description	5l bottle attached to wooden plank with drip system attached below Chicken-mesh is placed around the bottle to deter mammals	Chicken water feeding hung from a pulley system in a tree Sticky platform placed above feeder to deter ants	Tin cans connected to a wooden plank against a tree Chicken-mesh is placed around the cans to deter mammals	2l bottle connected to a BeePak ramp entering beehive Chicken-mesh is placed around bottle to deter small mammals
Advantages	Easy to fill without disturbing the beehive Drip speed adjustable to control sugar water intake	Easy to fill without disturbing the beehive Safe from ground-dwelling, medium-sized mammals	Easy to fill up without disturbing the beehive Resistant to gnawing by squirrels	Bees have direct access to sugar water Feeding station is safe from medium-sized mammals
Disadvantages	Honeybees are required to scout the feeding station Feeding station is vulnerable to small- and medium-sized mammals	Honeybees are required to scout the feeding station Chicken water feeder is vulnerable to major winds and baboons/monkeys	Honeybees are required to scout the feeding station Potential drowning of honeybees if overcrowding occurs	Direct contact with beehive: safety concern Sugar water spillage is an attractant to ants and wasps





Beehive Hanging Equipment

The following equipment is required to hang a single beehive from the branch of a tree

Equipment	Quantity
Cable Ties (200 mm x 5 mm)	8 - 12
Nylon Rope Length Equation: (2 x length from branch to 2 m above ground level) + 30 cm	2 strands
Staples/Nails	6
Plantex Glue and Wood Slab	1
Ladder	1
Hammer	1
Measuring Tape	1

Beehive Hanging Methods



Pre-Hanging Preparations

- Calculate the length of nylon rope required by using the equation described above.
- Loop the two ends of both nylon ropes so that each end has a loop to which cable ties can connect.
- Place the two nylon ropes over the branch of the tree ± 50 cm apart.
- Hammer in three staples/hails per rope to secure the rope to the tree's branch.
- The four loops should be in line with one another and ± 2 m above the ground.
- Apply a layer of Plantex glue further up each end of the rope using the wooden slab. This is to prevent ants from raiding the beehives.

i. Hanging Beehives - Wooden Beehives

- If beehive is active, use a red-light head torch when hanging the beehive at night.
- Place one cable tie in each of the beehive's handle's holes.
- Carry the active beehive to the tree from which the beehive will be hung.
- Place the ladder next to the four loops for one person to climb and connect the cable ties.
- Two people should lift the active beehive up so that the cable ties can be tied (each active beehive weighs ± 15 kg).
- Once all four cable ties have been connected to the four loops, add a second cable tie to each loop for additional strength and stability.
- Place the insulation lambdaboard between the ropes of the active beehive. Attach the insulation board to the beehive by placing one cable tie in each of the board's four holes and connecting these cable ties to the beehive's cable ties.

ii. Hanging Beehives - BeePak Hives



- Attach the ropes of the BeePak wooden platform to the ropes of the pre-hung nylon ropes using cable ties. Ensure that the platform is level.
- Lift up the BeePak hive and gently slide it across the wooden platform.
- Wrap a coil of rope around the perimeter of the beehive and the ropes of the wooden platform to ensure that the BeePak hive is stable against heavy winds.



Mike Kendrick



Tamsin Lotter

	Wooden Hives	Beepak Hives
Image		
Construction and cost	<p>Cheap and easy to construct from 2mm pine shelving wood. Wood is covered with two layers of Waskol paint, a wood preservative. Insulation board is ordered separately from <i>Insulpro</i></p>	<p>The BeePak hive is bought as a complete beehive from the <i>BeePak</i> company. BeePak hives are made from insulating material. Initial costs are more expensive in comparison to wooden catcher hives.</p>
Harvesting ease and honey quality	<p>Not easy to harvest honey as hives must be opened up by unscrewing the lid on the top. The absence of a queen gate means that honey will be mixed with brood</p>	<p>Easy to harvest as the brood and super boxes can be separated by opening the clips of the beehive. Honey from the super box is brood-free as a queen excluder separates the super box from the brood box</p>
Advantages and disadvantages	<p>Cheap and more aesthetically pleasing in the natural environment. Wood is, however, prone to warping and wax moth infestations, and the small size of the beehive restricts colony size.</p>	<p>Longer lasting and easy to open in the field. Larger size of beehive promotes larger colonies. May be aesthetically unpleasing in a natural environment context</p>
Effectiveness against elephants	<p>Effective against elephants. See Cook <i>et al.</i> (2018) for field trial results</p>	<p>Effective against elephants (ongoing field trials from November 2017 to present)</p>

Monitoring Beehive Condition and Activity in Trees

- Beehives should be continually monitored to ensure that natural elements do not influence the success of the beehive.
 - Natural elements such as rainfall, hail, wind, ants, hive beetles, spiders, squirrels and elephants can impact a beehive and decrease its chances of survival.
 - Aspects to be monitored should include:
 - Beehive wood condition
 - Lambdaboard condition
 - Cable ties' conditions
 - Rope condition
 - Plantex glue condition
 - Beehive colony presence
 - Presence of any hive pests (ants, hive beetles, spiders etc.)
 - Alterations to beehives should be made in the early morning or late evening/night when honeybee activity levels have lessened.
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The Science Behind The Manual

Cook, R. M., Parrini, F., King, L. E., Witkowski, E. T. F., & Henley, M. D. (2018). African honeybees as a mitigation method for elephant impact on trees. *Biological Conservation*, 217, 329-336.



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Acknowledgements

We would like to thank Elephants Alive and the Elephants and Bees Project for their logistical and financial support of this project. A special thank you to Kiss Me Organics for funding the printing of this manual and for their financial support for the project. A big thank you to Ronny Makukule and Prince Nkuna for their on-ground assistance in the field. We would also like to thank Woolworths and Relate for financing aspects of this project through the sale of a special edition of bags and bracelets. Numerous private donors contributed towards the sponsoring of specific hives. We thank Johan Labuschagne for designing the hives and overseeing the construction thereof. The EMS Foundation has financially contributed towards the installation of new BeePak hives amongst other ongoing support. The USFWS and the Oak Foundation have contributed towards aspects of the core funding needs of this project. Jejane Private Nature Reserve and Glen Thomson in particular, provided invaluable support. Mica Village staff together with Elephants Alive staff and visiting interns constructed the initial beehives while African Dream Horse Safari interns also helped hanging hives. Thereafter numerous Elephants Alive staff and visitors helped feed, collect and move bees when needed. Photographers Mike Kendrick and Tamsin Lotter documented our journey.

Contact Details

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BeePak

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