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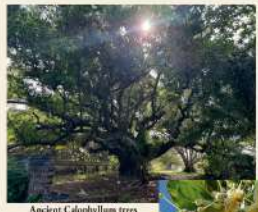
PP-496 [Beekeeping for Rural Development]

Sustaining Honeybee Populations in the Cocos (Keeling) Islands within an extreme environment for humans, yet perfect for honey bees, *living wild in the calophyllum and palm forests & managed using plastic beehives*

High tides and heavy rain create flooding on an islands with a 1.5m elevation

Unexpected bee subspecies with natural resistance to Varroa



Ancient Calophyllum trees and blossom

Wild swarms create large colonies. This one attached to an Octopus tree.

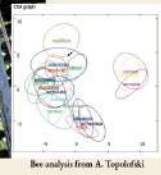
Methodology: Visiting the Cocos (Keeling) Islands in 2020, there were wild bees on Home Island, and a mixture of wild and hived colonies managed by two beekeepers on West Island. The two populated islands are separated by a lagoon, 9km wide and a string of a total of 27 islands make up the coral atoll. The beekeepers use a mixture of wooden and Apimaye plastic hives. For security of the bee population, there had been suggested that establishing managed bees on Home Island would secure the population. Due to biosecurity, queens can no longer be imported to the islands, situated around 4000 km from mainland Australia. Queens had previously been imported from Western Australia, most likely an Italian strain from Rottnest breeders. I decided to spend a year on the islands, living amongst the Islamic Cocos Malay community on Home Island to support the development of bee colonies. The plan was to establish a sustainable population of bees from existing colonies, providing pollination for the small farms on the island, and a business income from honey production for the local Cocos bee-keeping ladies. As the Home Island population are muslims, working with the bees according to the 16th Sura of the Qu'ran was appropriate. In the Qu'ran bees are referred to as female, which, at the time, was scientifically unknown. It made sense, therefore to work with the women of Cocos to preserve and research the bees of their islands.

Observing a wild colony inside an Australian pine tree.

Results. On arrival in April 2024, the wild colonies had died out on Home Island, leaving the nearest bees as wild colonies on South Island and hived & wild bees on West Island. In July 2024 a split was taken from a semi feral colony on West Island and transported across to Home Island by barge (9km). Then in August 2024 a further swarm was captured and also transported across the lagoon. By November 2024 there were 5 colonies, managed by Paula and two local Cocos Malay women. By February 2025 there were 5-8 colonies, consisting of 2 wild (in trees) and 5 managed Cocos Malay ladies). The bees were sent for analysis to Prof Adam Topolofiski in Poland and the results showed a high genetic sampling of Apis mellifera intermissa. This challenges the belief that the bees were brought from Europe in the 1940s. Key learnings from observing the expansion of these colonies:

1. Very mild mannered in temperament on Home Island, compared to the colonies on West Island. Could this be due to management methods? (No smoking, minimal honey harvesting, no over manipulation, or from selecting feral swarms?)
2. The environment on Home Island (HI) is very relaxed and community based due to 100% Islamic practice.
3. Abundance of forage, year round. Calophyllum trees in full bloom every 6-8 weeks. Coconut blossom, abundance of blossom on mangrove trees. Wild flowers.
4. Apimaye beehives are perfect for managed colonies on the islands. Resistant and resilient to tropical weather conditions (extreme heat and humidity, strong winds and heavy rain.) Ease of movements for temporary relocation is also useful during floods. With women managing the colonies, it was essential to have hives that were easy and light to manoeuvre. Honey harvesting using the natural comb provided a pure honey product and maintained colonies through their own wax production, rather than quickly filling up hives and swarming if foundation was used.
5. No pests, diseases or predators for the bees enabling them to thrive.
6. It was believed that no other bee species lived on the islands, however Paula Carnell located numerous colonies of a carpenter bee , ceretina sp. spread across the islands.

A giant colony wrapping beeswax around the trunk of a coconut palm



Bee analysis from A. Topolofiski

Bees not eating their own honey due to abundance of nectar

Conclusion.

Due to the abundance of nectar and pollen year round, the bees were not interested in consuming their own honey. This meant hives soon built up honey stores in all available space, frames and lids of hives. Wild colonies in trees, able to survive outside on branches, soon built up to be substantially sized, sending off swarms regularly. Heavy monsoon style storms and cyclone weather put wild colonies at risk, however they appeared to adapt, attaching palm fronds and leaves as 'roof' structures over their brood combs. Further research on the native bee species, their locations and habitat is required and to study any interaction between the two species.

Further research:

- Analysis of honeybee species
- Study of Queens and sustainable reproduction
- Thorough bee audit of all bee species across islands
- Training on Queen rearing for local Cocos bee ladies.
- Analysis of honey and propolis for medicinal benefits and properties

Ceretina sp.

Transporting swarm in a box from a Frangipani tree

Beekeeping classes on Home Island

Bees building natural comb in Apimaye hives

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PAULA CARNELL

PP-496 [Beekeeping for Rural Development]
Sustaining Honeybee Populations in the Cocos Keeling Islands within an extreme environment for humans, yet perfect for honey bees, managed and living wild in the calophyllum and palm forests, using plastic beehives

Paula Carnell
Paula Carnell Limited

As a remote coral atoll in the Indian Ocean, presents unique challenges for establishing and maintaining a sustainable beekeeping project. Limited access to supplies, language barriers, and the uncertainty surrounding the islands' future make this initiative both complex and critical. Despite these obstacles, our project has demonstrated resilience, sustainability, and potential long-term benefits for both human and bee populations. The logistical difficulties of life on the atoll are considerable. Fresh food arrives only via air freight every two weeks, while essential supplies are transported by ship every eight weeks, often facing delays. There is no telephone network, and internet access is limited to WiFi-enabled buildings. The Cocos Malay community speaks its own variant of Indonesian, with younger generations more fluent in English, adding an additional layer of complexity to knowledge-sharing and training initiatives. Beyond these logistical challenges, the islands are under existential threat. According to an Australian government coastal erosion report, they are projected to be submerged within the next 50 years. Additionally, the planned expansion of the airport runway for military use has created widespread fears of forced evacuation. If the population is displaced, the world risks losing not only a unique cultural community but also an invaluable research opportunity into the thriving of honeybees in a pristine environment.
Our beekeeping project raises important questions: Could the existence of a healthy honeybee population, potentially producing medicinal honey, contribute to the argument for preserving and protecting the islands? Can this initiative provide a sustainable livelihood that justifies maintaining a human presence? With global honeybee populations under threat, studying bees in such an undisturbed setting offers critical insights into their natural resilience and their profound connection to human well-being. To address the challenges of extreme humidity and strong winds, we have implemented the use of plastic beehives, which offer better durability and protection for the colonies. This presentation will explore how beekeeping in the Cocos Keeling Islands serves as a model for sustainability under extreme conditions, how it fosters community empowerment despite political and environmental uncertainty, and how it may provide a compelling case for safeguarding this fragile yet remarkable ecosystem.