



# Beekeeping & sustainability



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# Sustainable beekeeping

1. Consideration of sustainable beekeeping
  - More than just 'organic'
  - Considering honey bee population health
2. Sustainable beekeeping is well exemplified by tropical African beekeeping
3. Consequences of frame hive beekeeping for honey bees
4. Can African beekeeping teach something about sustainability ?

# Beyond 'organic' beekeeping .... ..... to sustainable beekeeping

## ***What is beekeeping?***

Keeping honey bee colonies in ways that yield benefits for people

## ***What is sustainable beekeeping?***

Keeping honey bee colonies in ways that yield benefits for people, and in the long term securing the health and vitality of intact honey bee populations

# Beyond 'organic' beekeeping .... ..... to sustainable beekeeping

- Thinking about
  - 'close to natural'..... not just 'chemical-free'
- Thinking about
  - the maintenance of healthy honey bee populations  
..... not just honey bee colonies





Conventional, globalised beekeeping  
- is (so far) frame-hive beekeeping with *Apis mellifera*.

- Is organic frame hive beekeeping the best we can do?
- Different approaches are used successfully in some world regions

## Is 'organic' beekeeping = sustainable beekeeping?

- Some beekeeping systems are 'better than organic'
- For example, beekeeping in tropical Africa
- Practised well, tropical African beekeeping is sustainable:
  - For the individual honey bee colony
  - For the whole honey bee population

# John is a beekeeper in Tanzania



- John owns 120 local hives
- Not all his hives will be occupied at any one time.
- John accepts that honey bee colonies are mobile.
- He harvests from only a proportion
- He is managing his bees affordably, successfully, sustainably.



# African beekeeping is extensive



- Beekeepers have many hives
- Hives are distributed over a large area
- Only some hives are occupied at any time
- Honey bee colonies are mobile
- Bees live their natural life

# *Apis mellifera* in tropical Africa

- Tropical honey bee colonies are highly mobile. They:
  - Swarm – *for reproduction and evolution*
  - Abscond – *to escape from pest invasions*
  - Migrate – *to take advantage of forage and climate*

***Sustainable, extensive beekeeping  
accommodates these tactics for survival and  
adaptation***





Local hives – being cheap, this means that the beekeeper can have many – this is an affordable and effective strategy





Management and manipulation are minimal – bees live as in the wild, and swarm as they need



Fixed comb hives – difficult to harvest but the bee population is easily maintained through natural increase





# Honey from indigenous bees in local hives – no problems with diseases



# No chemicals or medicines used





# African exports - an apicultural success story



- ✿ Regular export to EU
- ✿ Organic certified
- ✿ Meeting all EU import requirements

# Sustainable beekeeping in Africa



- Use hives that are simple, cheap and effective – this allows beekeepers to have many hives
- Indigenous honey bee populations – healthy and evolving
- No medicines or chemicals used
- Minimal manipulation and management
- Bees swarm and migrate as they need
- Bees live as they would naturally

# Beekeeping in tropical Africa

Is characterised by:

- No breeding for human ideas of 'desirable' characteristics
- No movement by humans of honey bee colonies
- Bees choose where and how they nest
- No suppression of honey bee diseases
- Natural evolution is allowed to take place
- Beekeepers focus on extensive populations of bees, rather than individual colonies



# African beekeeping

Negative aspects:

- Fixed comb hives make harvesting difficult
- Sometimes many bees are killed during (various styles of) honey harvesting
- So called 'traditional' methods do not (yet) earn respect, especially by planners seeking to 'modernise apiculture'

# Tropical African beekeeping is sustainable system

Large, intact, and diverse and apparently healthy populations of *Apis mellifera* remain only in Africa

Most honey bee diseases are present in Africa, without deleterious effects

- Absence of breeding
- High genetic diversity
- Large, intact populations
- Less stress allowing honey bees to defend themselves, and to evolve

Conventional 'globalised' beekeeping is intensive



Frames and boxes give the  
beekeeper control over the  
colony

The focus is at the level of the  
colony - not on the whole  
honey bee population



## In conventional beekeeping – management of the colony is key



- All hives should be occupied with bees
- Swarming (reproduction) is prevented
- Bees in frame hives – many differences from a natural nest
- Bees do not live a fully natural life



## Conventional beekeeping interventions affect the fitness of honey bee populations:

- Prevention of swarming (queen clipping, removal of queen cells, provision of drawn comb and supers, other managements to prevent swarming)
- Drone culling
- Use of foundation and methods that discourage drone production

Management action	Possible risks
Opening and checking	Disturbing carefully maintained nest scent and heat of the brood nest
Reusing combs	Disease build-up
Moving bees (migratory beekeeping)	Spread diseases, stress in transit
Many colonies	Overcrowding means diseases spread quickly, perhaps not enough forage
Swarm control	Risk of reducing genetic diversity, interferes with local adaptation
Feeding sugar	Poor nutrition
Importing queens and bees	Spread disease, interfere with local adaptation and evolution

## During the 20<sup>th</sup> century



- Beekeeping changed from:
  - a time when beekeepers wanted swarmsto:
  - a time when beekeepers did not want swarms
- We changed our beekeeping from a ‘population level’ activity, to a ‘box level’ activity\*

*\*Edward Nobbs 1969  
Skep beekeeper*

# Modern beekeeping systems erode genetic fitness

‘... Keeping honey bee colonies in hives ...  
shunting of resources into storage and away  
from reproduction - benefits beekeepers, but  
hurts the bees, whose genetic fitness would  
be greater if they concentrated more on  
reproduction, and less on honey storage’

*Professor Tom Seeley, 1985*

# Are beekeeping practices sustainable?



- In Europe, few wild honey bee populations remain intact
- Great cost of honey bee diseases
- Losses of honey bee colonies



## Extensive, African beekeeping can inform beekeeping in other countries:

- Maintain healthy populations of bees by allowing bees to swarm (and therefore to evolve)
- Allow colonies to make decisions:
  - Concerning ratio of males to females
  - Concerning colony size
  - Concerning nest building (can affect brood rearing, resilience, communication)
  - Concerning resource use

Apiaries should  
have some colonies  
that are allowed to  
live naturally and to  
swarm

**A nice example from Turkey!**



# ‘Natural’ beekeeping methods may be a way forward!

Top-bar hives




Warré hives



## In conclusion – considering sustainability in beekeeping

- Sustainability must be assessed from these perspectives:
  - Ecological (healthy colonies and populations, welfare, genetics)
  - Social (practical within local contexts)
  - Economic (apiculture that is financially feasible)
- Not all these aspects of sustainability are addressed within standards for ‘organic’ beekeeping .



**Thank you for listening  
– I welcome your ideas!**

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