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## Is what you see what you get?

### Pollen composition and labeling of Greater Cape Floristic Region honey

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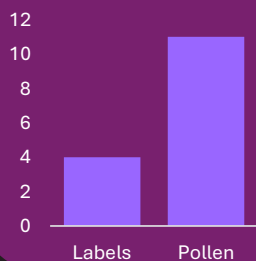
An important aspect of honey authenticity is whether the label accurately describes the product (origin authenticity).<sup>1</sup> Melissopalynology, the study of pollen and spores in honey, is a reliable method for identifying the type of honey and potentially where it was harvested from.<sup>2</sup>

South African honeys are poorly studied due to the lack of expertise and resources.<sup>3</sup> Here, we provide one of the first pollen snapshots of  $\pm 70$  honeys from the Greater Cape Floristic Region (GCFR). The goal was to see what types of honeys are produced and whether their labels accurately reflect their composition.

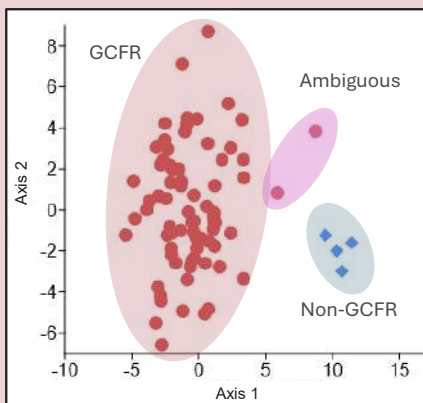
### Labels and pollen don't agree!

|      | Mono  | Misidentified mono | Multi |
|------|-------|--------------------|-------|
| Mono | 40.0% | 10.0%              | 50.0% |

We have more types of monofloral honey than collection says!



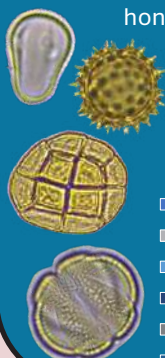
Pollen fingerprint successfully distinguishes GCFR honey from others....



### Lost opportunities?

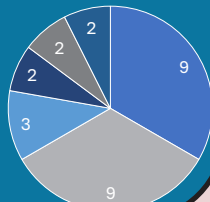
|         | Mono  | Multi |
|---------|-------|-------|
| Multi   | 1.5%  | 8.8%  |
| Neutral | 20.6% | 69.1% |

Beekeepers prefer neutral labels e.g. "raw honey" or "pure honey" to avoid misleading consumers.



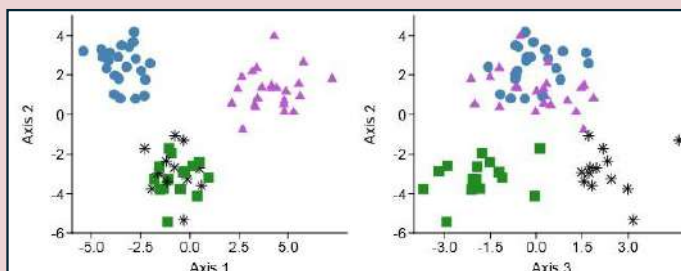
Bees visited over 70 plants! These were the most common:

- Daisies
- Legumes
- Mallows
- Stone plants
- Borages
- Mints



...and within the region! A true reflection of the uniqueness of Greater Cape Floristic Region.

★ Fynbos ■ Renosterveld ● Subtropical Thicket ▲ Succulent Karoo



#### Important literature:

<sup>1</sup> Bogdanov and Martin (2001). Honey authenticity: a review. [https://www.researchgate.net/publication/228505284\\_Honey\\_Authenticity\\_a\\_Review](https://www.researchgate.net/publication/228505284_Honey_Authenticity_a_Review).

<sup>2</sup> Von der Ohe et al. (2004). Harmonized methods of melissopalynology. *Apidologie* 35, 518–525.

<sup>3</sup> Delport et al. (2022). A new conceptual framework for the development of international melissopalynological research: Africa as a case study. *Review of Palaeobotany and Palynology*. <https://doi.org/10.1016/j.revpalbo.2022.104695>



**Is what you see what you get? Investigating the pollen composition and commercial label of Greater Cape Floristic Region honey**

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Honey is classified as authentic based on its composition and description. The description of the honey, be it the botanical (the type of product) or geographical (where it is from) origin, should reflect the true properties of the honey. If not, then the product is considered fraudulent. The most conventional method for inferring the botanical and geographical origin of honey is through melissopalynology, which is the study of pollen and spores in honey. While South African honeys are ubiquitously marketed under labels such as “Fynbos”, “Protea”, “Strandveld”, or “Cape” honey, there is very little melissopalynological research available to inform the validity of these descriptions. As such, melissopalynological analysis was performed on one hundred honeys from Southern Africa, with the majority originating from the Greater Cape Floristic Region (GCFR), South Africa. The aim was to determine whether the number of honey types available on the local market truly reflected the diversity of honeys produced in the GCFR. This was done by recording the pollen spectra of the honeys, comparing the pollen spectrum with the honey’s commercial label, and investigating the viability of geographical differentiation at an international, national, and regional level. The honeys were incredibly diverse (> 70 pollen types), which is consistent with the pollen diversity described in the only other study from the region. Few honeys qualified as monofloral, with the most common types being Eucalyptus, Lobostemon/Echium, and local monofloral types, such as Aizoaceae-type, Erica, and Phyllica. The commercial denominations of the honeys could be categorized into four groups, being neutral (49%), botanical (24%), and geographical (23%) denominations, or a combination (4%) thereof. The prevalence of honey marketed under neutral denominations is likely a consequence of the lack of origin verification services. In general, the commercial denomination did not reflect the pollen composition of the honey, with many monofloral honeys sold under neutral denominations e.g. “raw honey”. The pollen diversity allowed for geographical differentiation at three scales, being international, national, and regional. Lastly, honeys with ambiguous geographical origins were identified and photos of differentiating pollen taxa included for future reference.