# Supporting Community-led Conservation efforts for Amm

# beebytes

*A social enterprise providing genetic testing and analysis services for honey bees and other pollinators. Working to maintain healthy pollinator populations and support biodiversity & conservation.*

www.beebytes.org @beebytescic

- Founded December 2020
- Spin-out from Roslin Institute
- Team of 3 ‘specialists’:
  - Dr Mark Barnett - Genetics (and bees!)
  - Matthew Richardson - Data Science (and bees!)
  - Dr David Wragg - Bioinformatics
- Social Enterprise
- Not-for-profit









- (Honey) Bee Genetics
  - Sub-species analysis
  - Microbiome
  - Breeding
- Pollen Analysis
  - Pollen from Honey
  - Environmental Pollen
- e-DNA



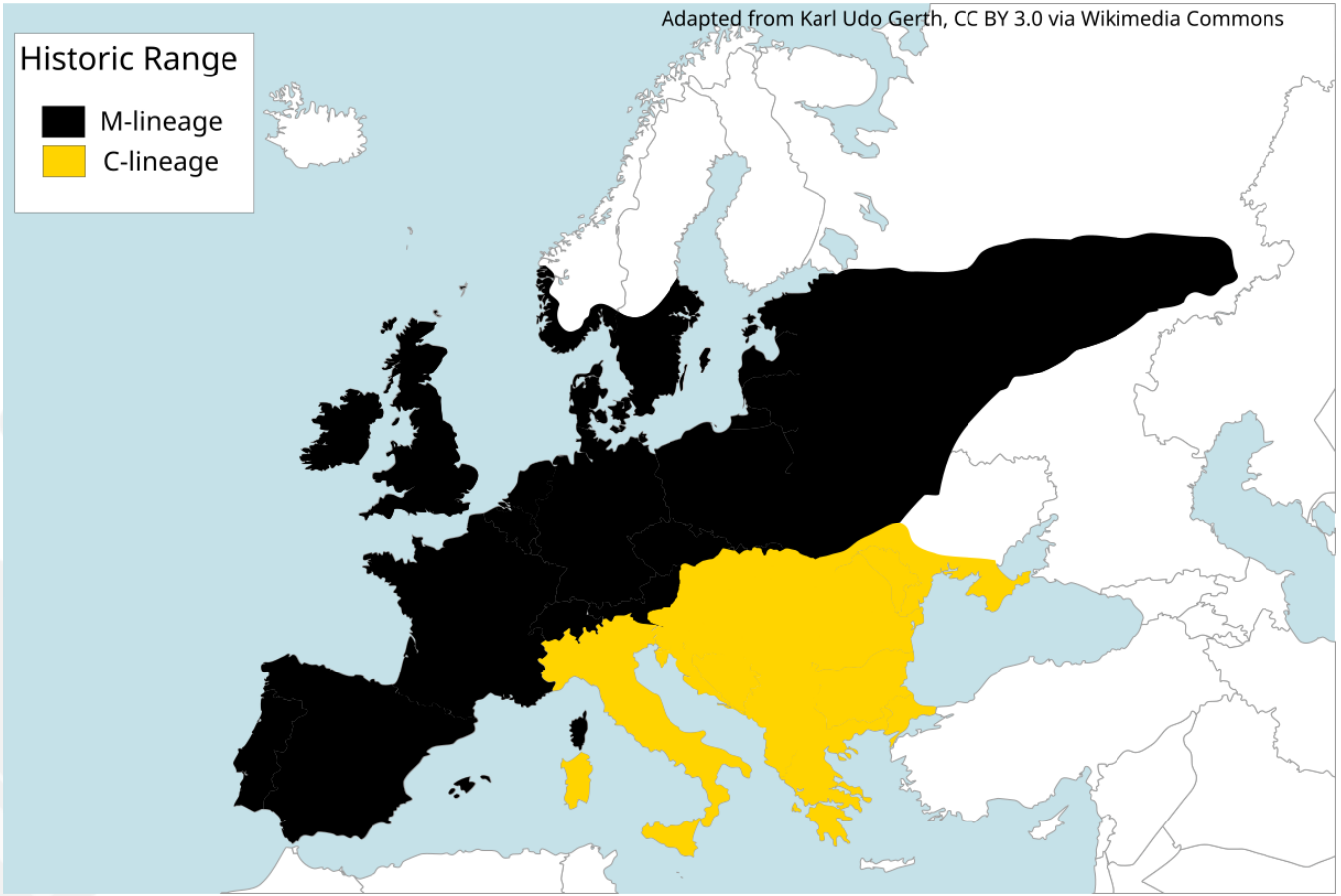
# Lineage Analysis



# Honey Bee Subspecies



# Honey Bee Sub-species



# M/C Lineage Assay

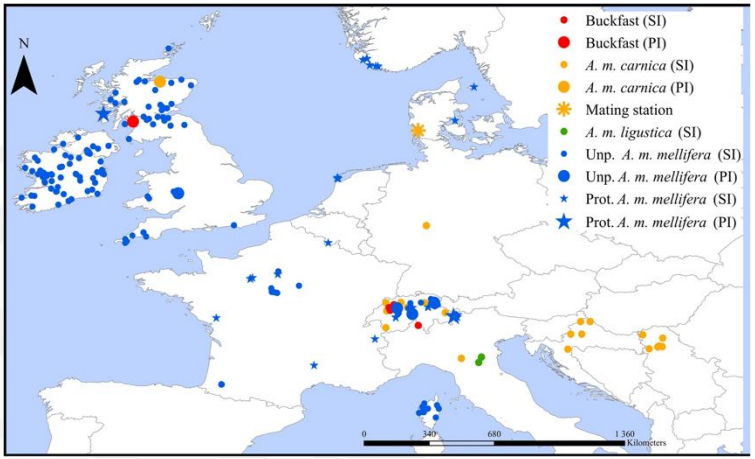
**High sample throughput genotyping for estimating C-lineage introgression in the dark honeybee: an accurate and cost-effective SNP-based tool**

Dora Henriques, Keith A. Brown, Mark Barnett, Melanie Parejo, Per Kryger, Thomas Freeman, Irene Munoz, Lionel Garnery, Fiona Highet, J Spencer Johnston, Grace P. McCormack, M. Alice Pinto

Royal (Dick) School of Veterinary Studies

*Research output: Contribution to journal › Article › peer-review*

## 2018 - Henriques et al




## M-Lineage



## C-Lineage

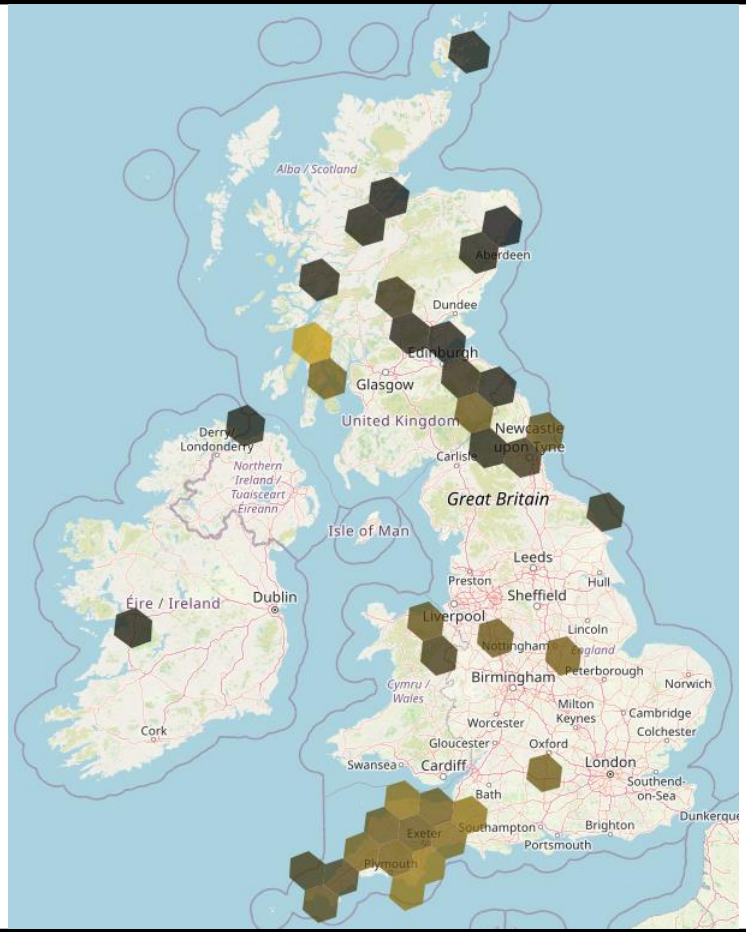


## Hybrid





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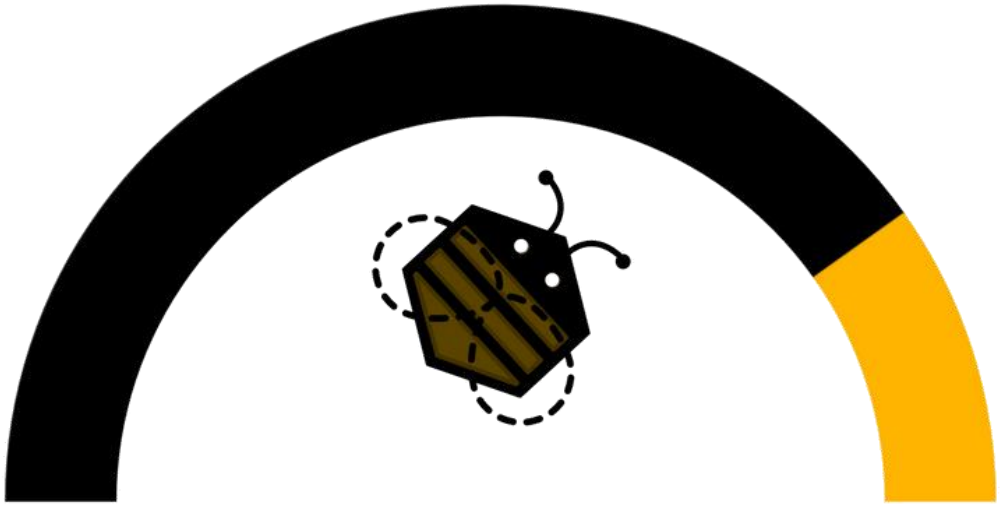

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**2021-2025**

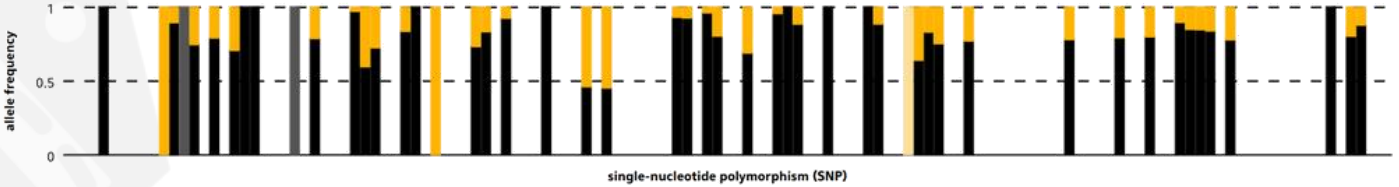
**UK: ~400 colonies**

**Ireland: ~500 colonies**

# M/C Lineage Testing - Peebles



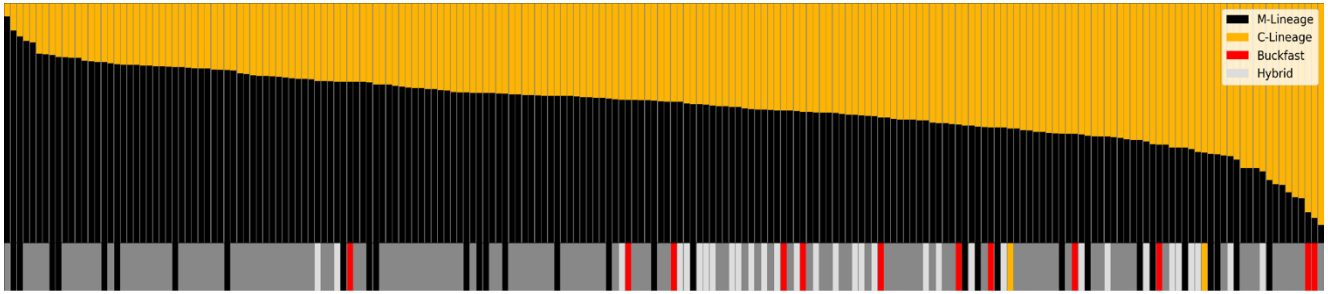
M-Lineage: 80.3%  C-Lineage: 19.7%

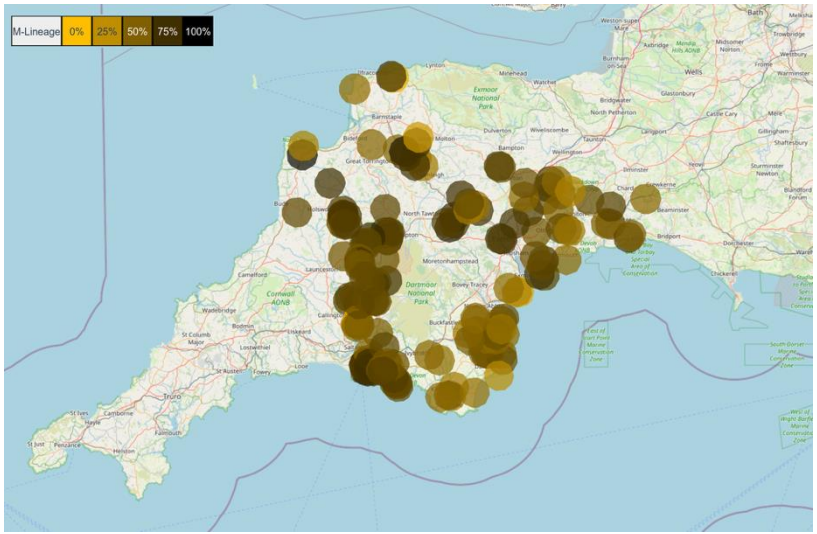





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Mean: 58%

Range: 7.5%-94.5% *Amm.*

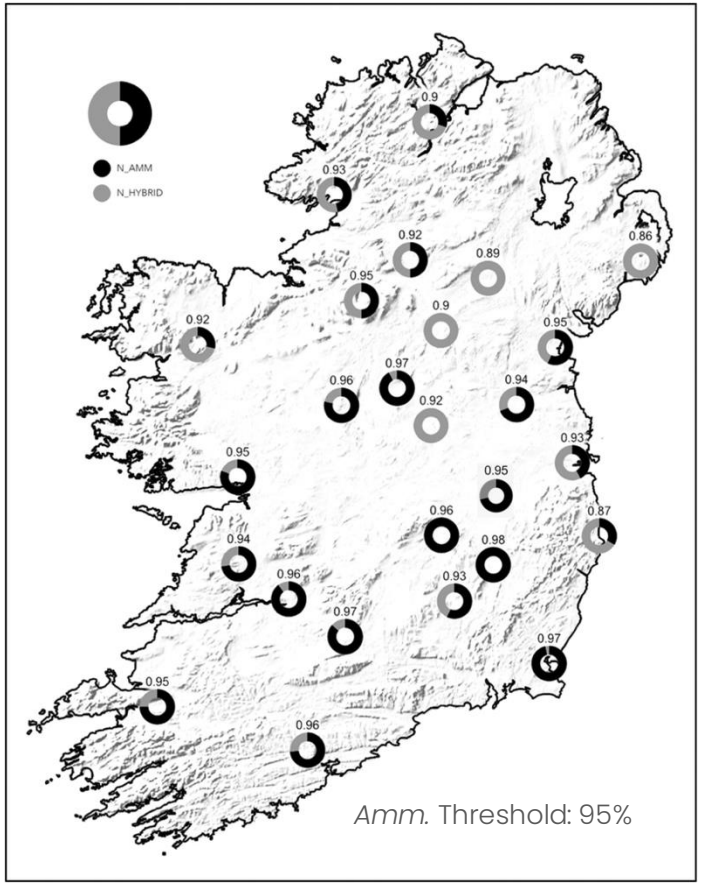
Pollenize

THE B4 PROJECT

Ollscoil na Gaillimhe
University of Galway

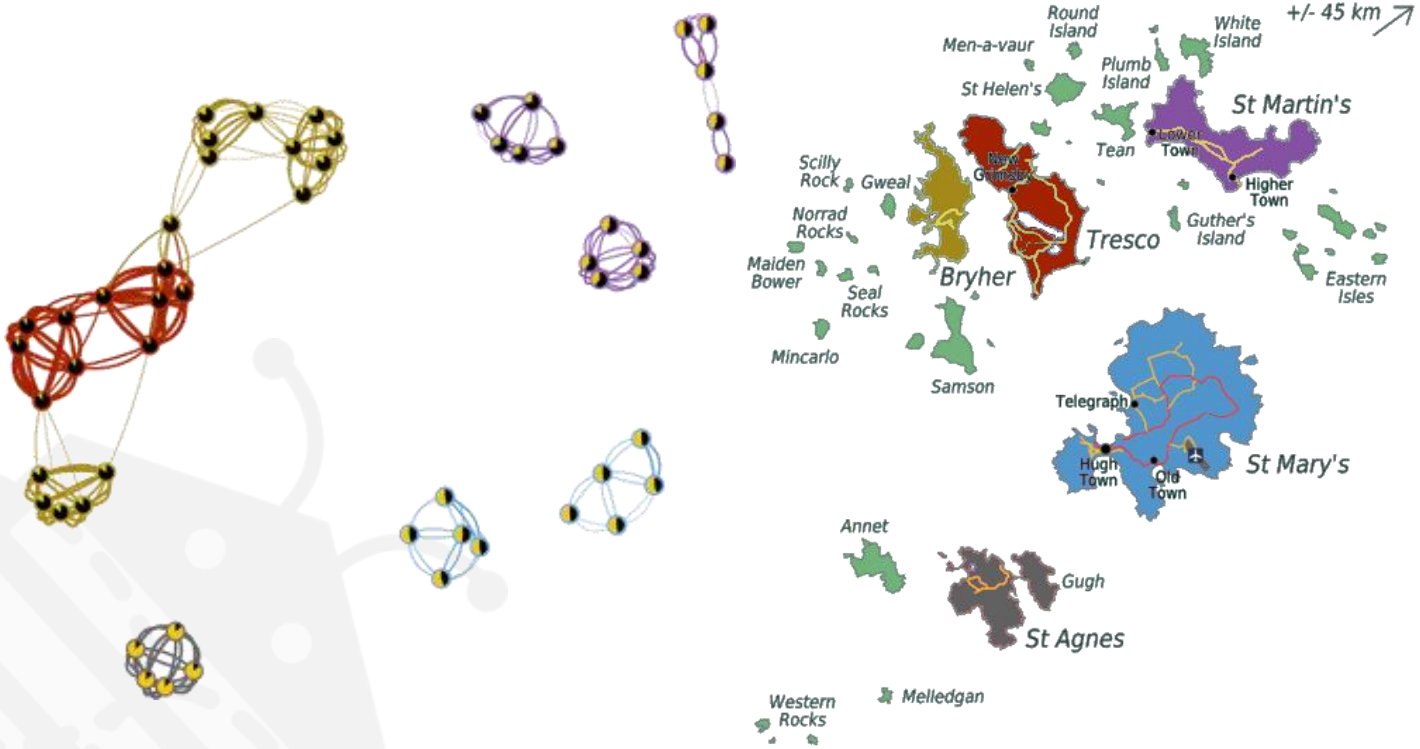
GALWAY HONEY BEE RESEARCH CENTRE

Native Irish Honey Bee Society
*Apis mellifera mellifera*




Valentine, A. *et al.* (2024) 'Introgressive hybridisation puts the distinctive population of *Apis mellifera mellifera* in Ireland at risk: evidence from a multidisciplinary approach', *Journal of Apicultural Research*, 64(1), pp. 202–216.

# Whole Genome Sequencing



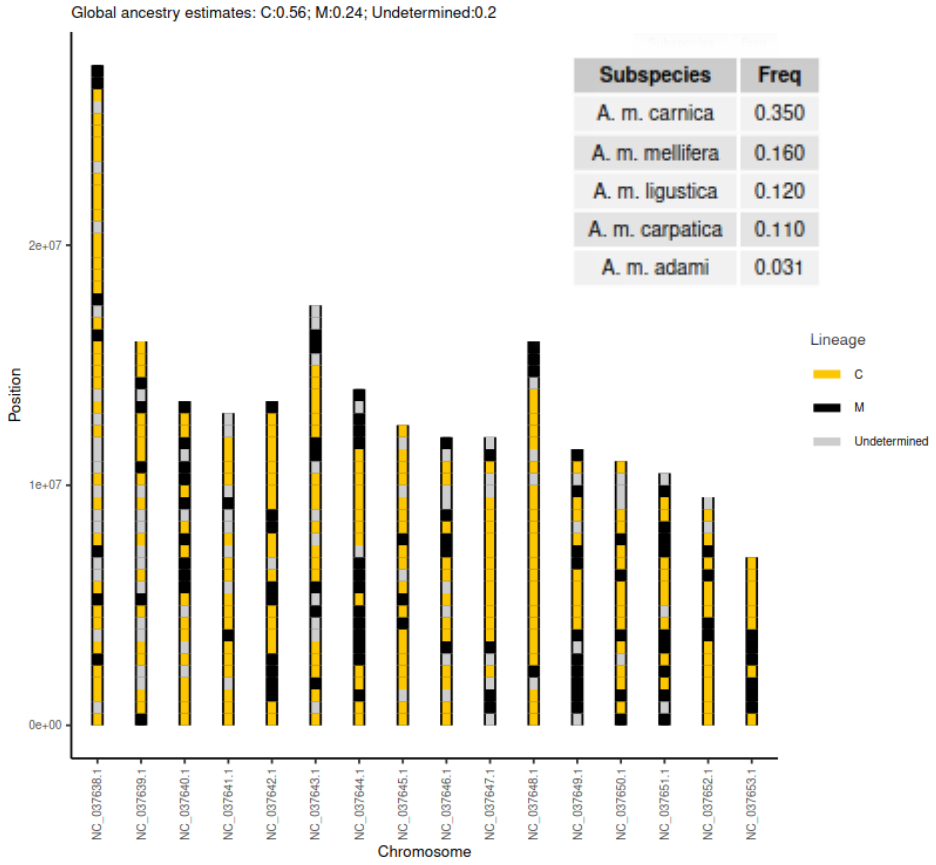

THE B4 PROJECT

Pollenize

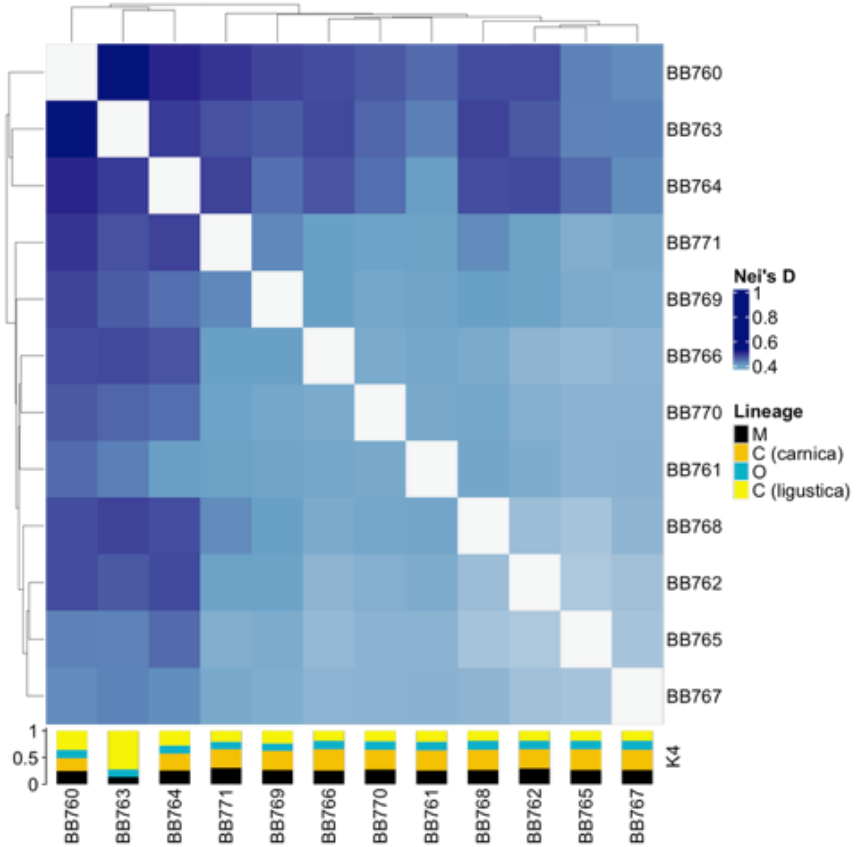
wildflower collective

BeeCraft

# Newfoundland Bees




| Subspecies | Freq |
|---|---|
| A. m. carnica | 0.350 |
| A. m. mellifera | 0.160 |
| A. m. ligustica | 0.120 |
| A. m. carpatica | 0.110 |
| A. m. adami | 0.031 |



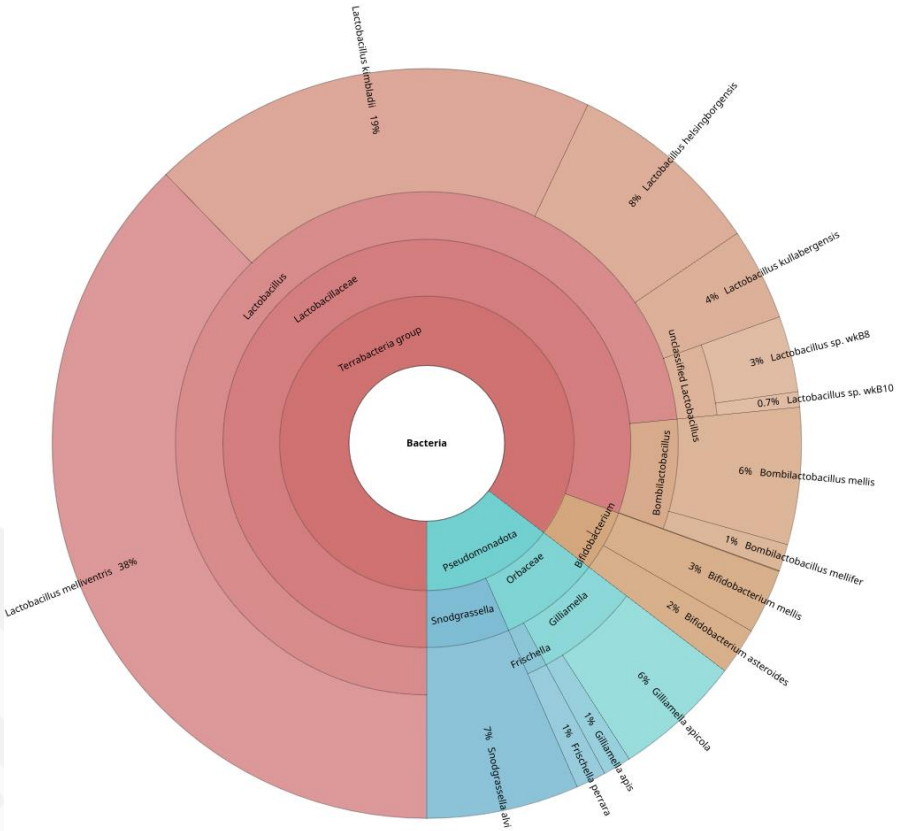


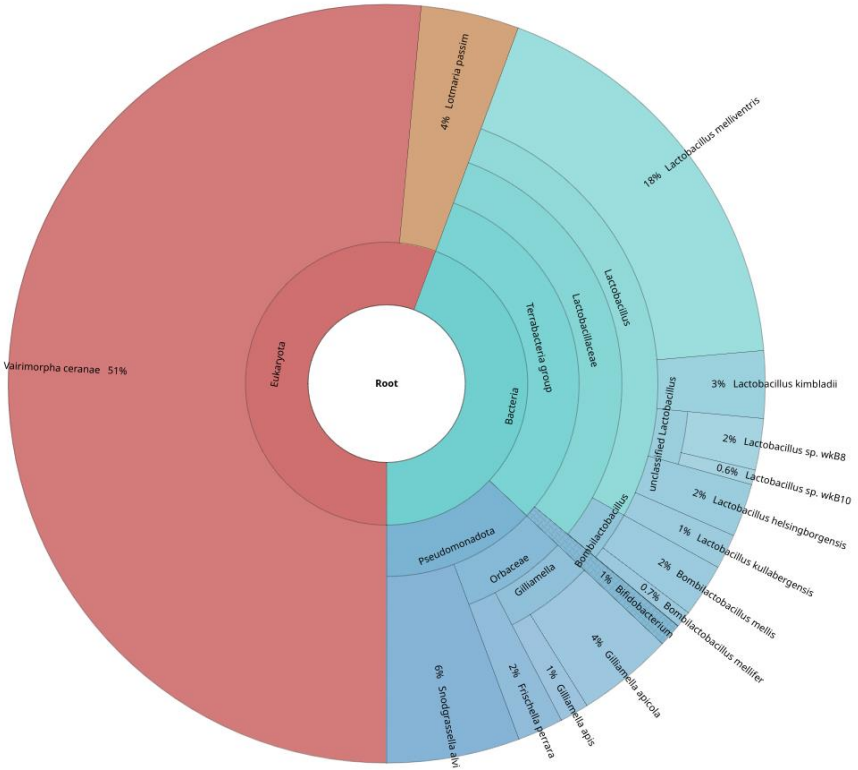

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# Microbiome Sequencing



# Scilly Isles: Microbiome



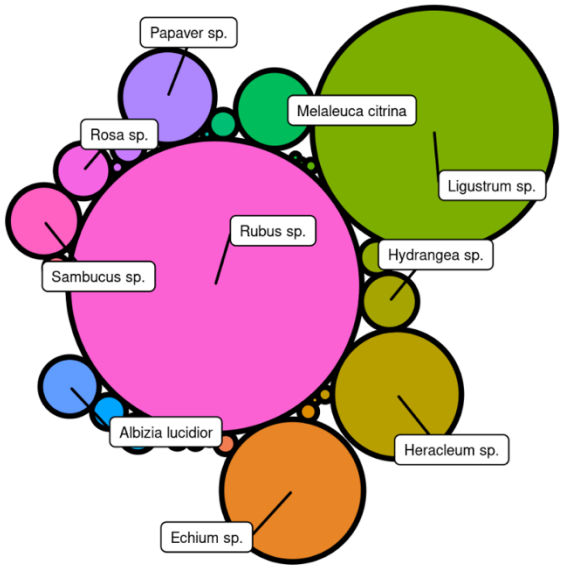



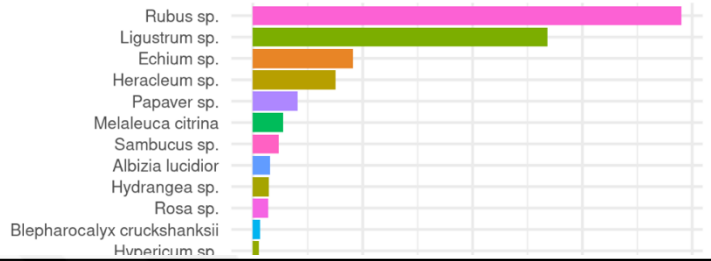



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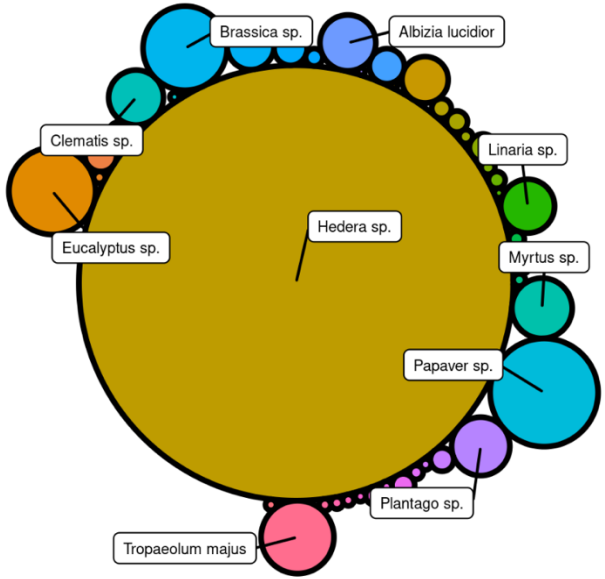
# Pollen Metabarcoding

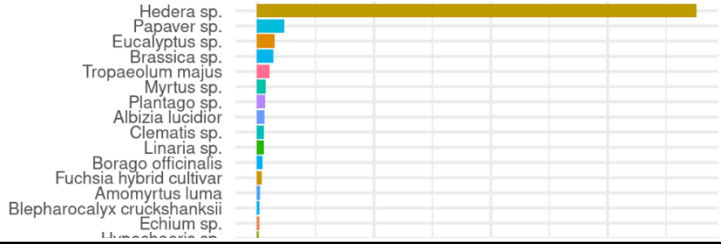
**Viridiplantae: Plymouth, June-20**



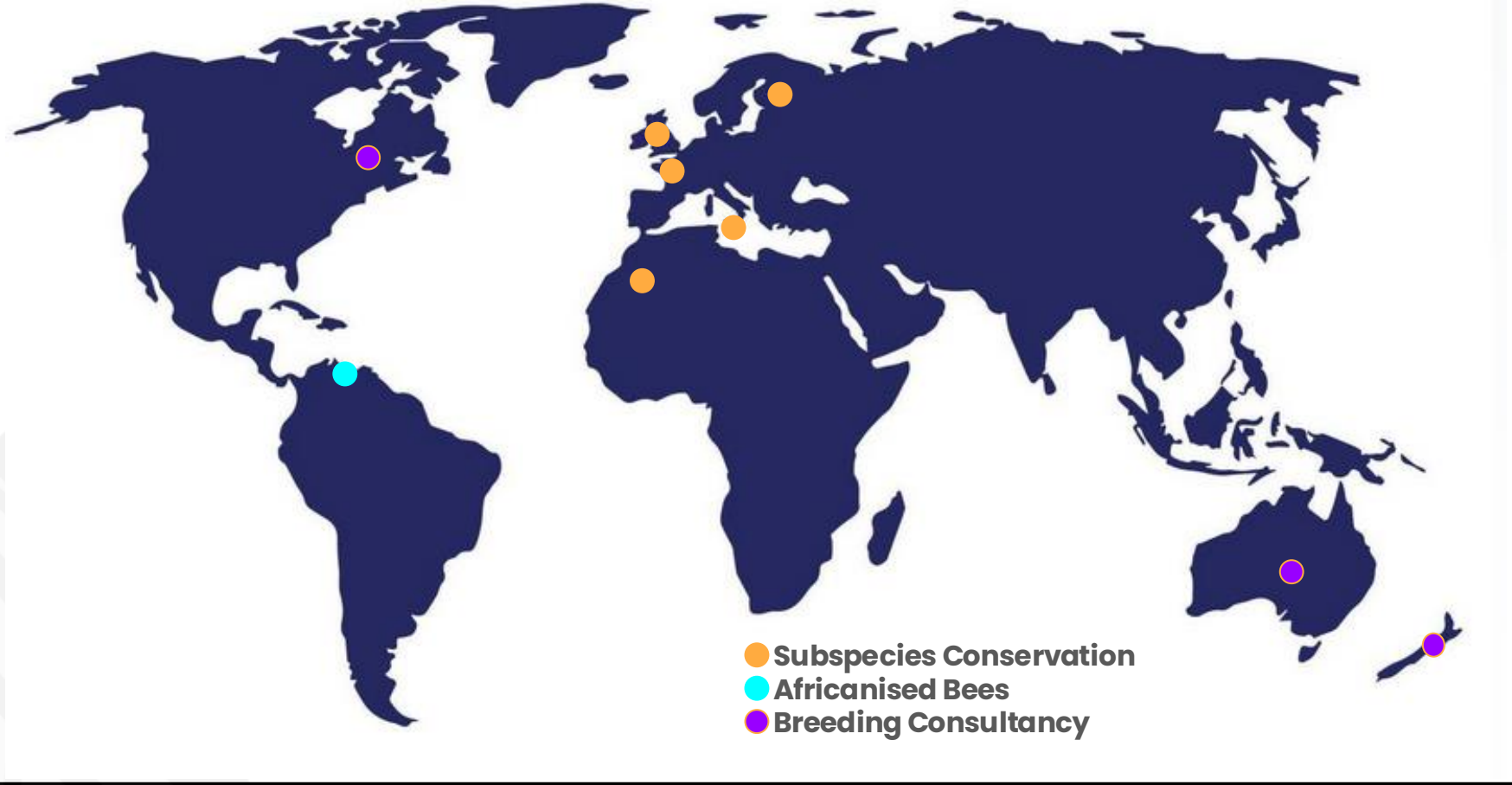

**Viridiplantae: Plymouth, September-20**



# Future Work

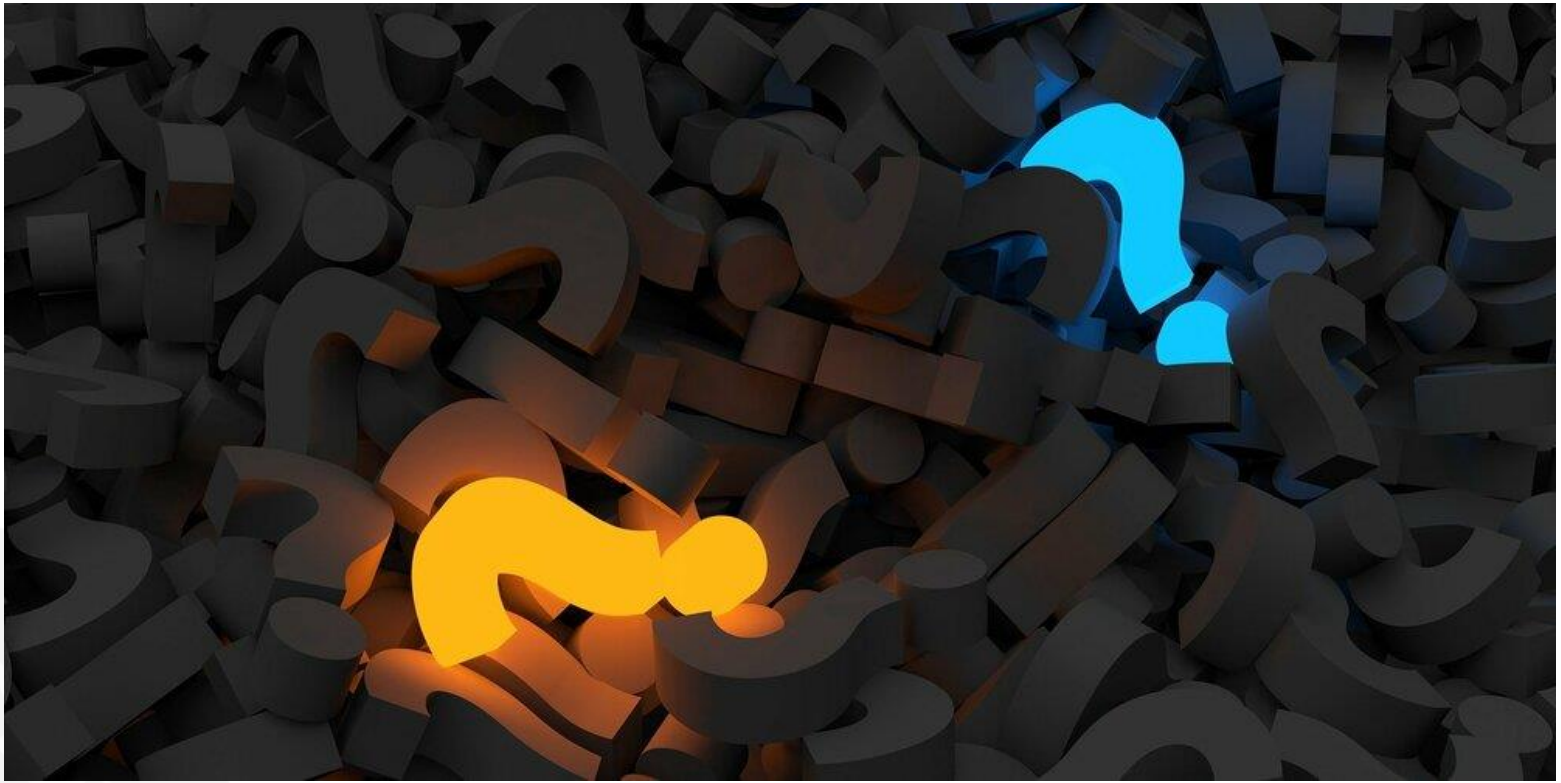



Subspecies Conservation
Africanised Bees
Breeding Consultancy

- Experimental Design
- Cost & Effort
- Timescales
- Communicating Results
- Outcomes & Implementation



# Any Questions?



contact@beebytes.org