Honeybush cultivation, a potential ecological trap?

Assessing the vulnerability of wild *Cyclopia* populations to genetic pollution by the expanding Honeybush industry

N.C. Galuszynski, Dr A.J. Potts, Prof. R.M. Cowling

What's the problem(s)? Genetic threat.

Erosion-Swamping-Hybridization

Genetic erosion

The diminishing or loss of a unique gene pool within a species

High intensity wild harvesting

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Establishment of low diversity plantations

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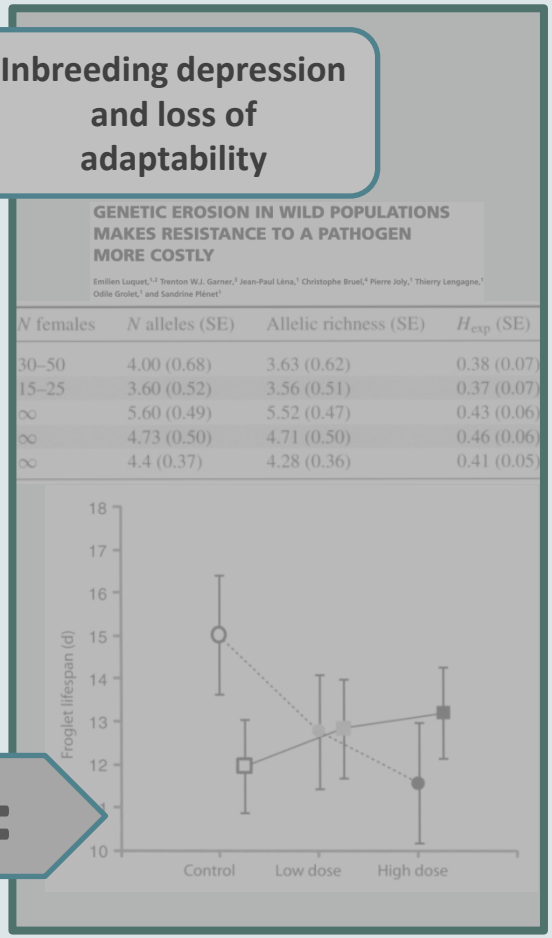
Inbreeding depression and loss of adaptability



GENETIC EROSION IN WILD POPULATIONS MAKES RESISTANCE TO A PATHOGEN MORE COSTLY

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N females	*N* alleles (SE)	Allelic richness (SE)	H_{exp} (SE)
30–50	4.00 (0.68)	3.63 (0.62)	0.38 (0.07)
15–25	3.60 (0.52)	3.56 (0.51)	0.37 (0.07)
∞	5.60 (0.49)	5.52 (0.47)	0.43 (0.06)
∞	4.73 (0.50)	4.71 (0.50)	0.46 (0.06)
∞	4.4 (0.37)	4.28 (0.36)	0.41 (0.05)

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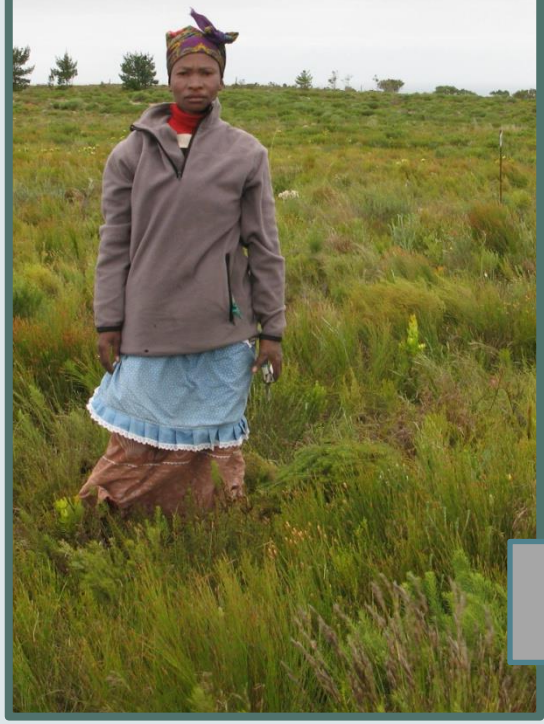

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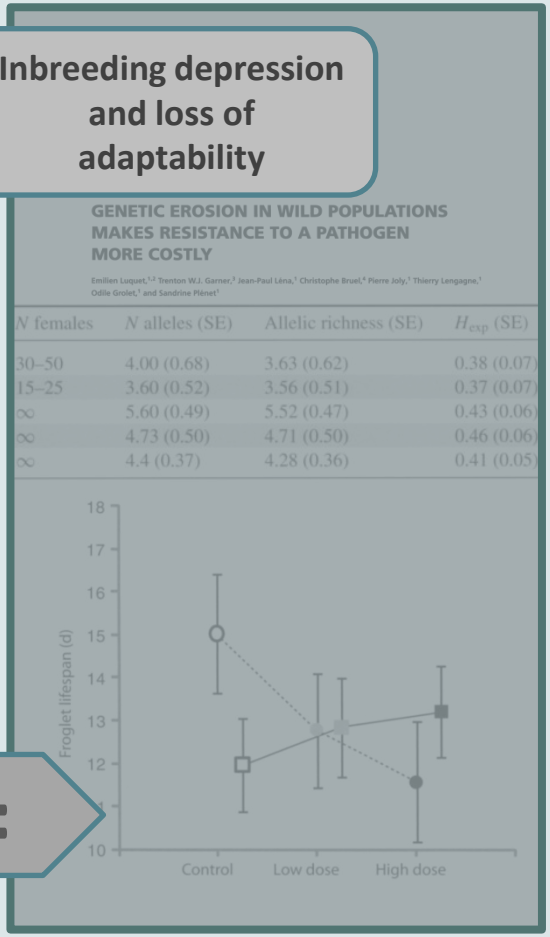

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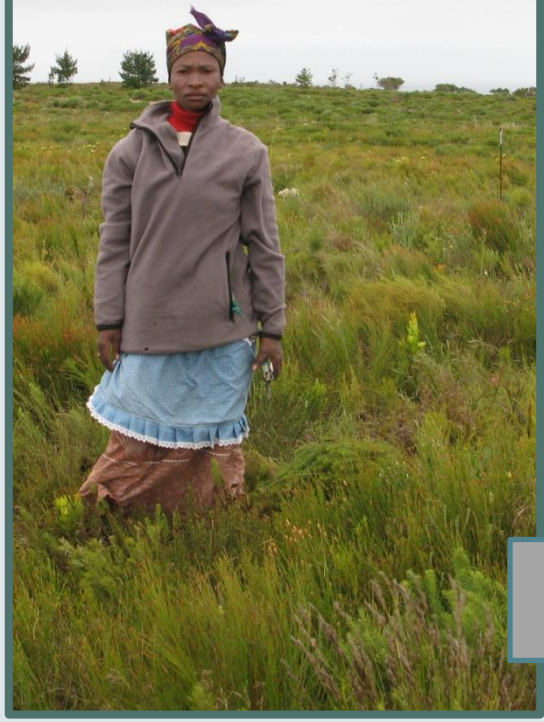

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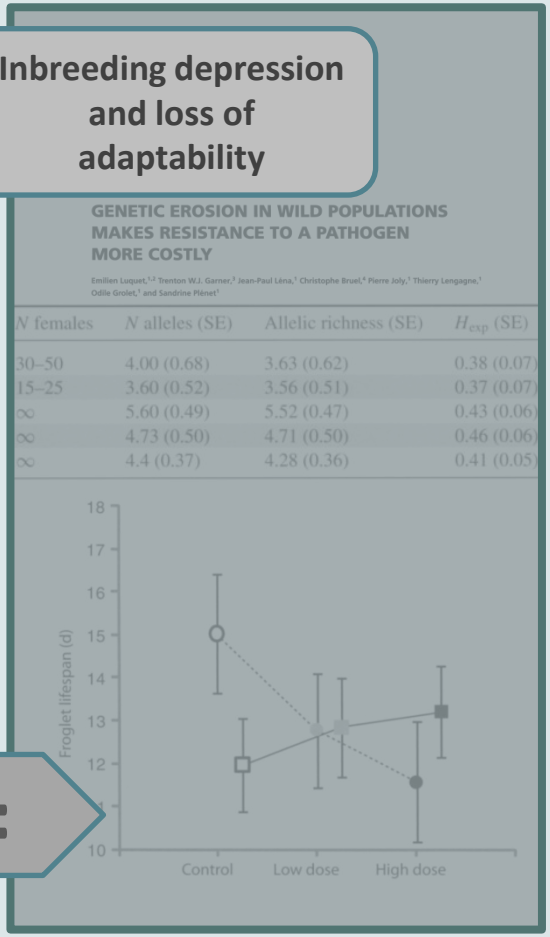

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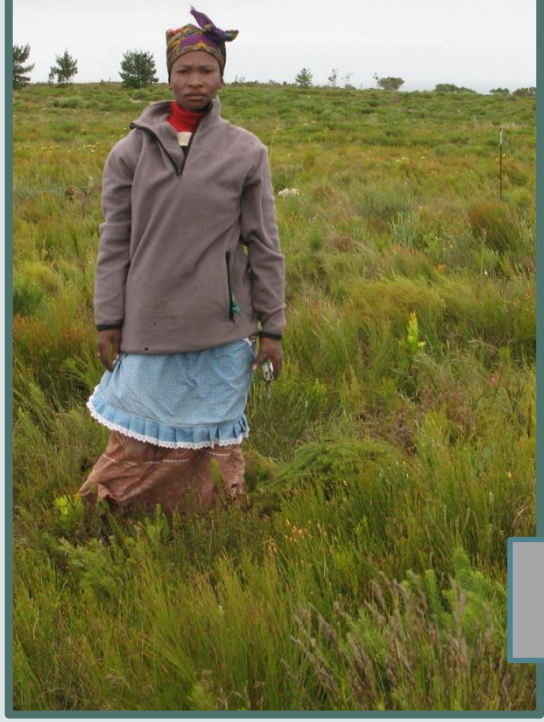

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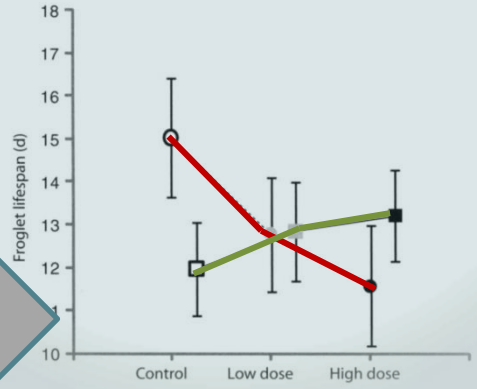
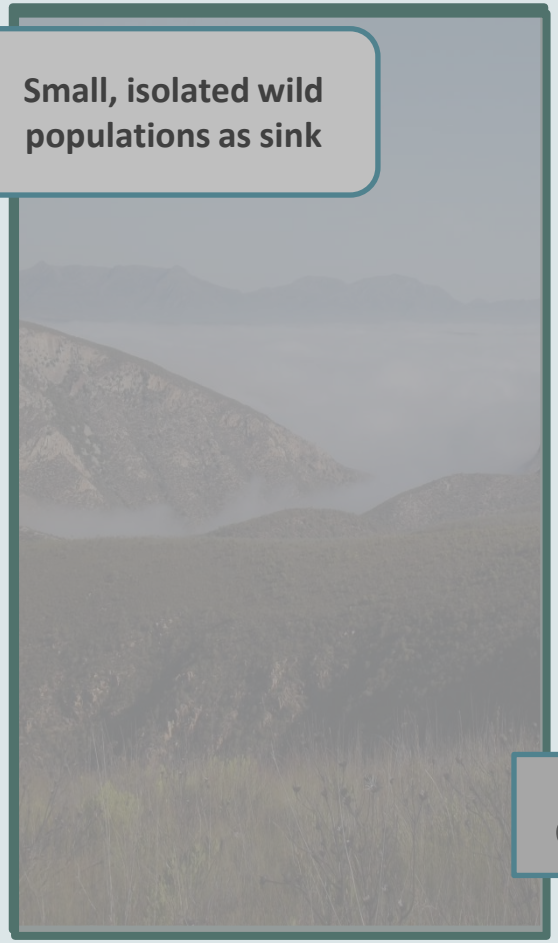


Genetic Swamping

Replacement of locally adapted genes with those of foreign origins

Small, isolated wild populations as sink



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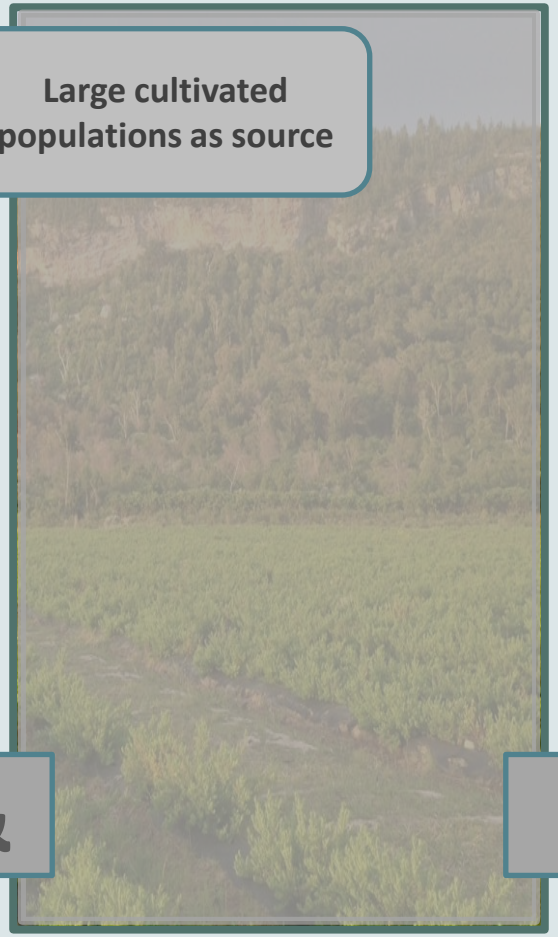

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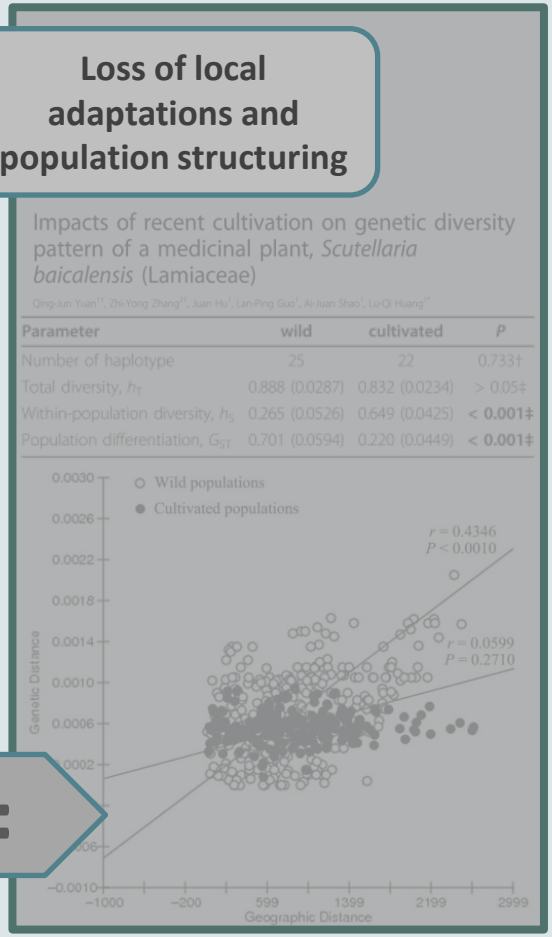
Loss of local adaptations and population structuring



Impacts of recent cultivation on genetic diversity pattern of a medicinal plant, *Scutellaria baicalensis* (Lamiaceae)

Qing-Jun Yuan[1†], Zhi-Yong Zhang[2†], Juan Hu[1], Lan-Ping Guo[1], Ai-Juan Shao[1], Lu-Qi Huang[1*]

Parameter	wild	cultivated	*P*
Number of haplotype	25	22	0.733†
Total diversity, h_T	0.888 (0.0287)	0.832 (0.0234)	> 0.05‡
Within-population diversity, h_S	0.265 (0.0526)	0.649 (0.0425)	< **0.001‡**
Population differentiation, G_{ST}	0.701 (0.0594)	0.220 (0.0449)	< **0.001‡**

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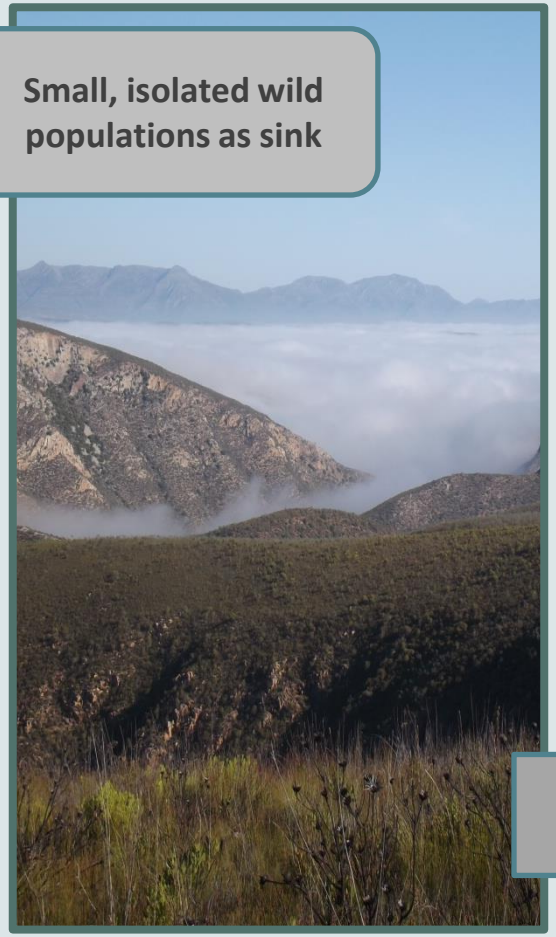

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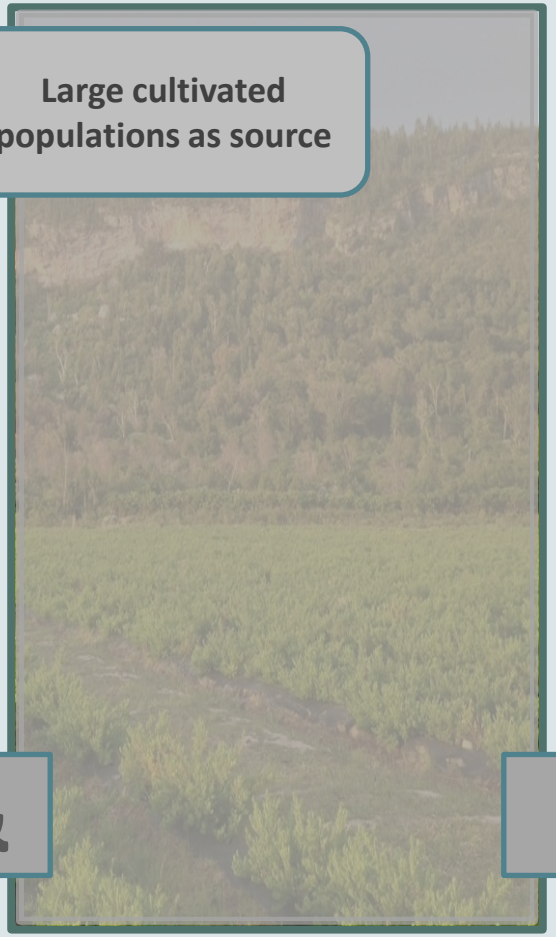

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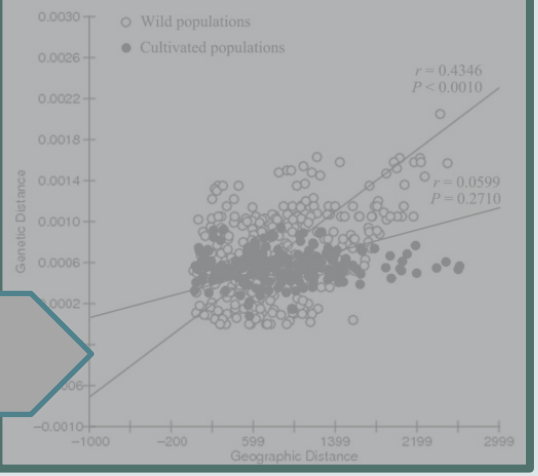

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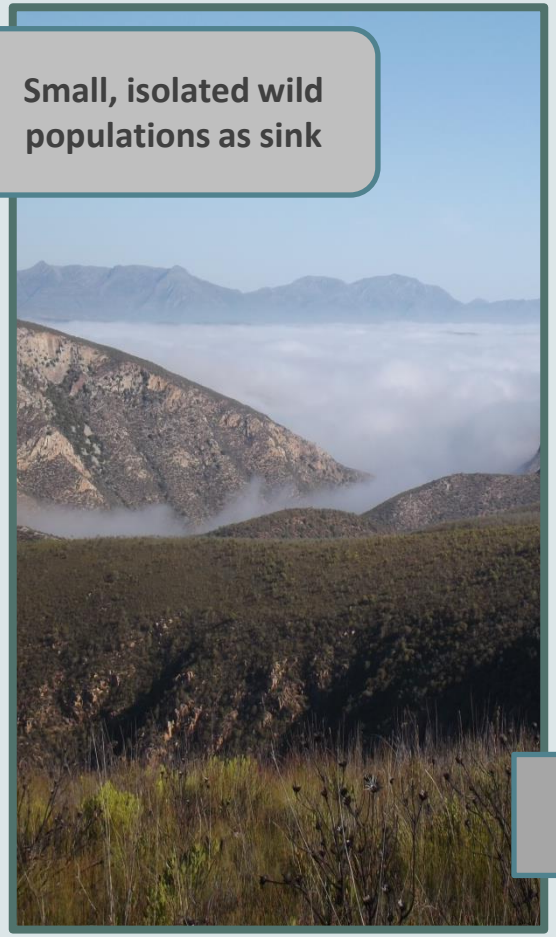

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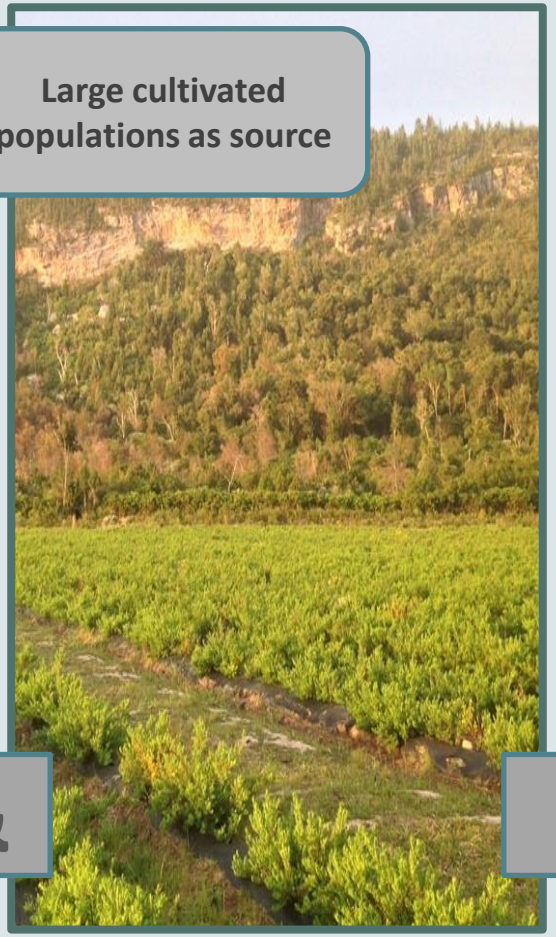

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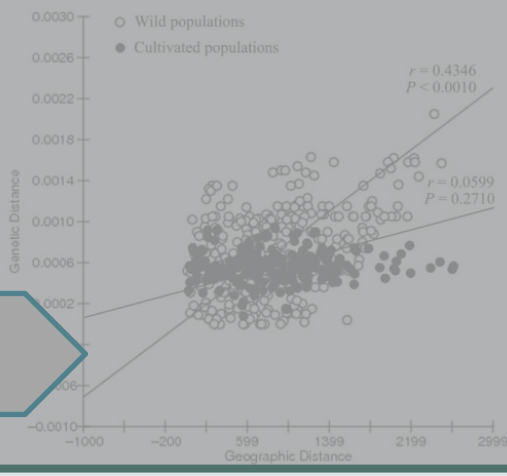

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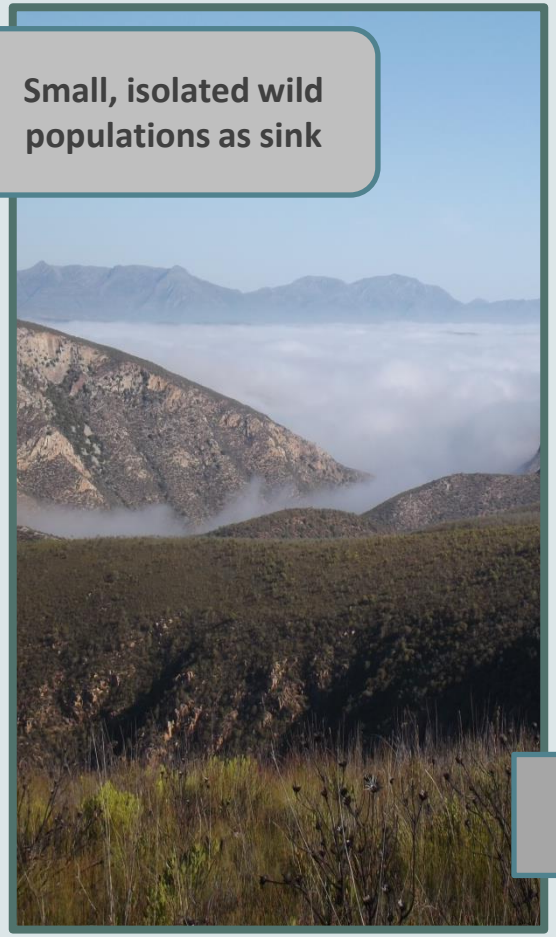

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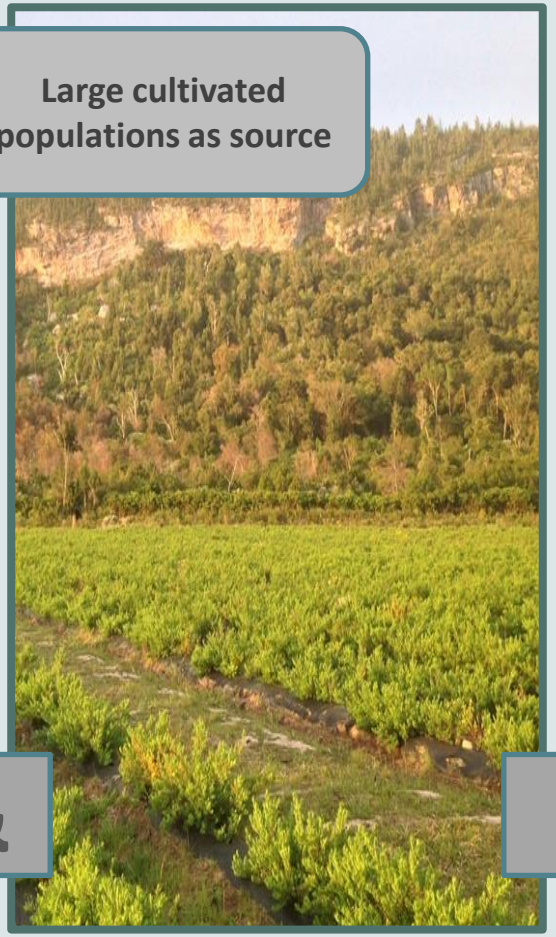

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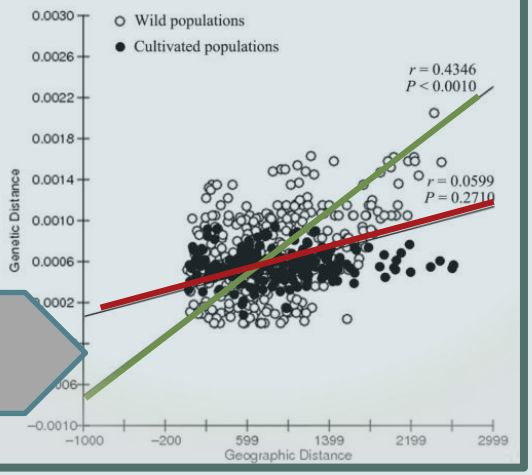
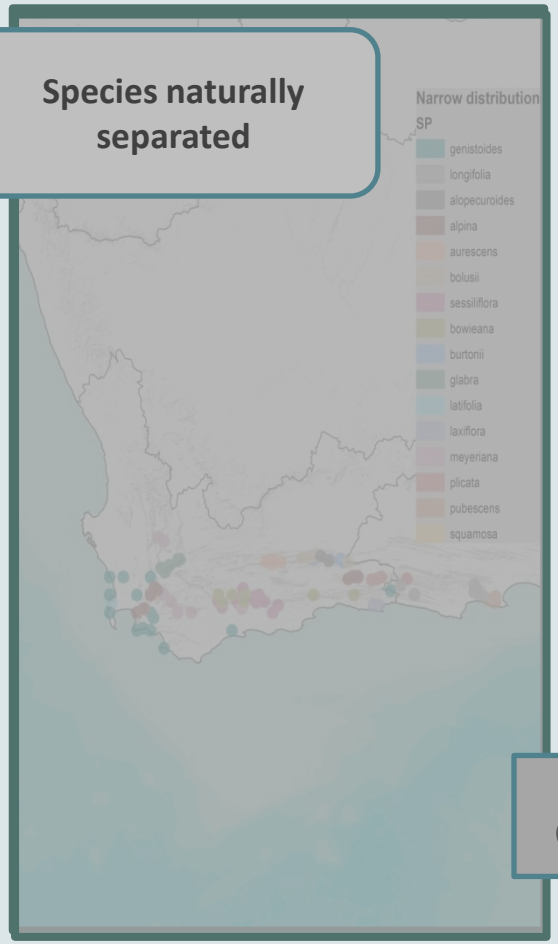


Hybridization

Formation of new ecotypes or species through distant outbreeding

Species naturally separated



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Cultivated populations break barriers

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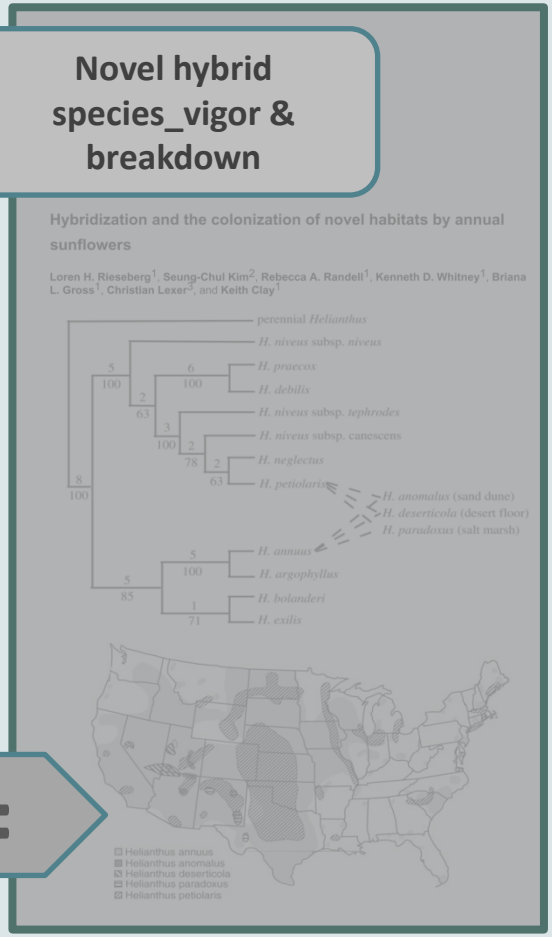
Novel hybrid species_vigor & breakdown



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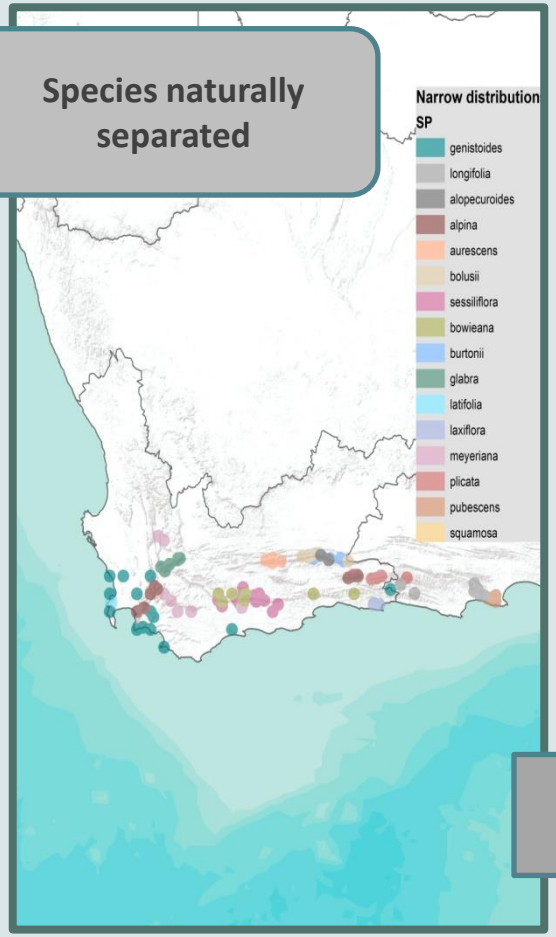

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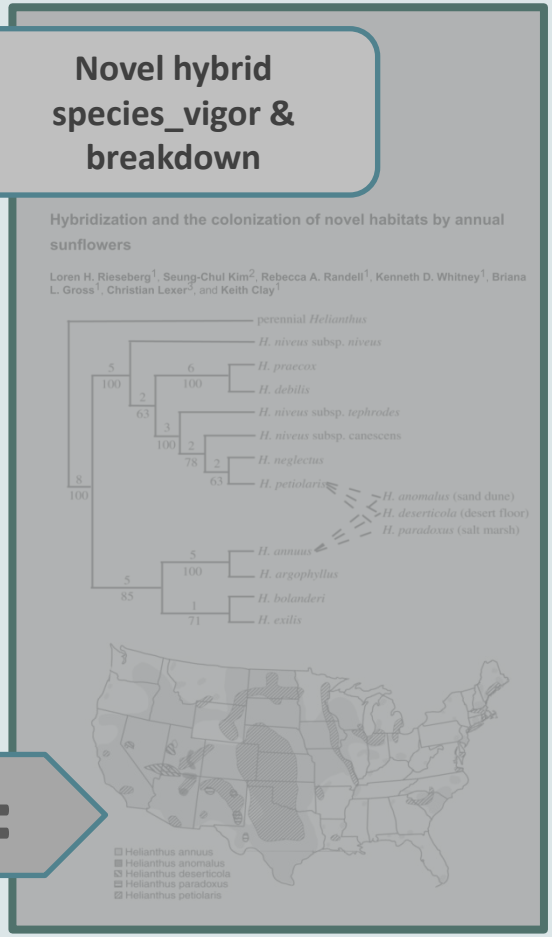

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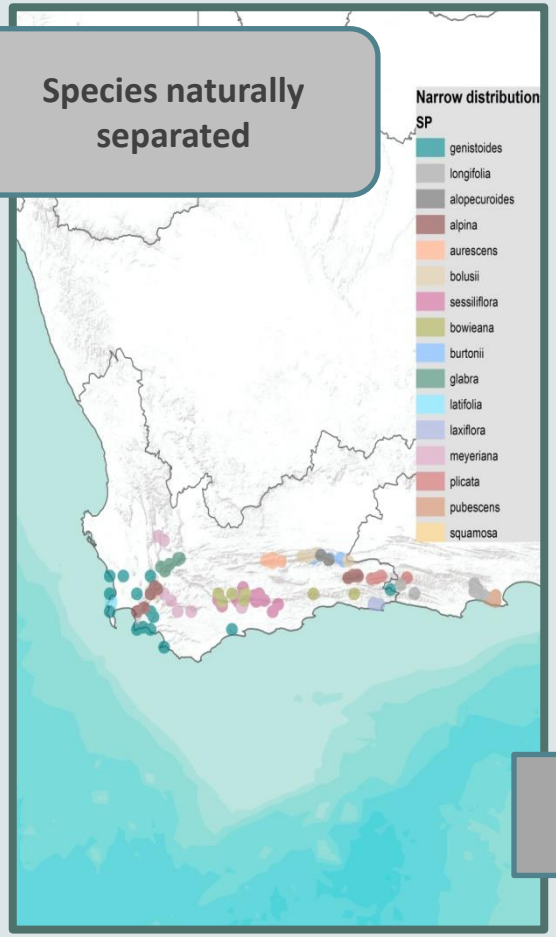

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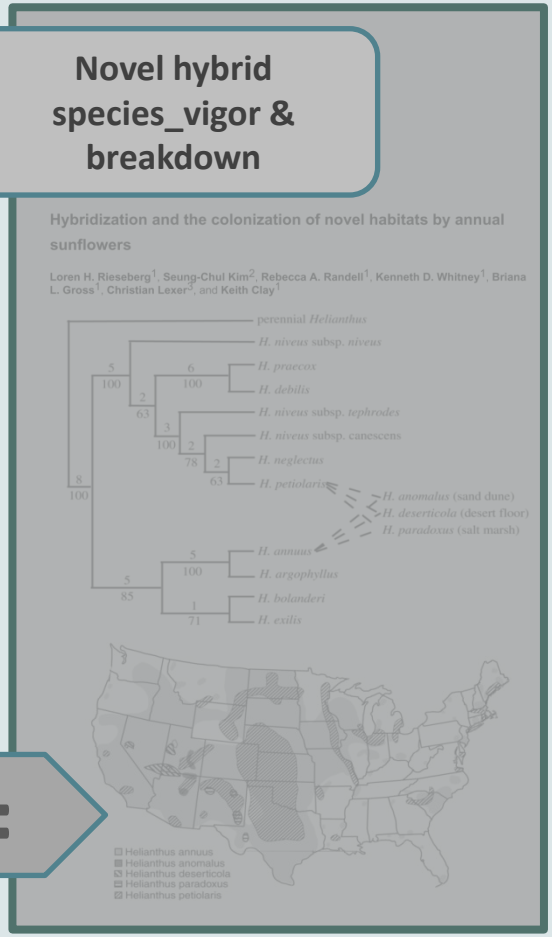

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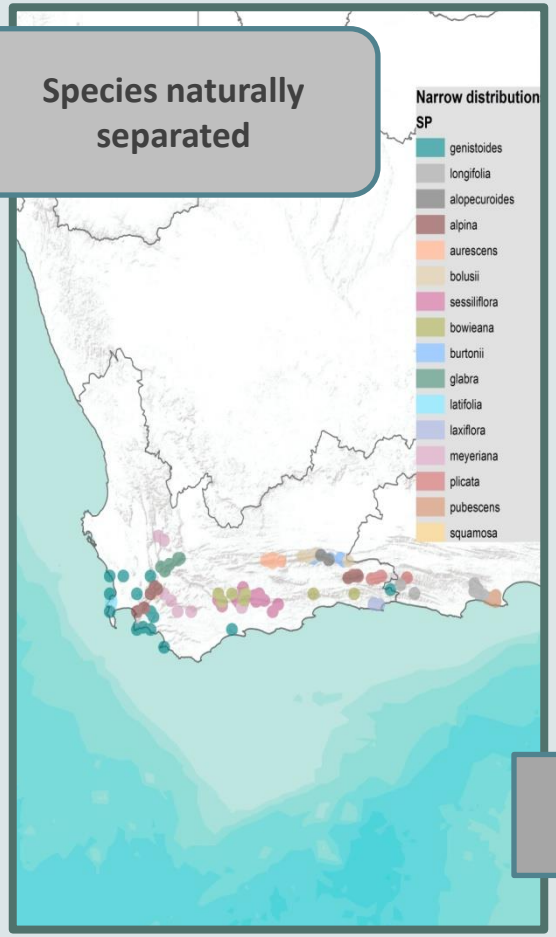

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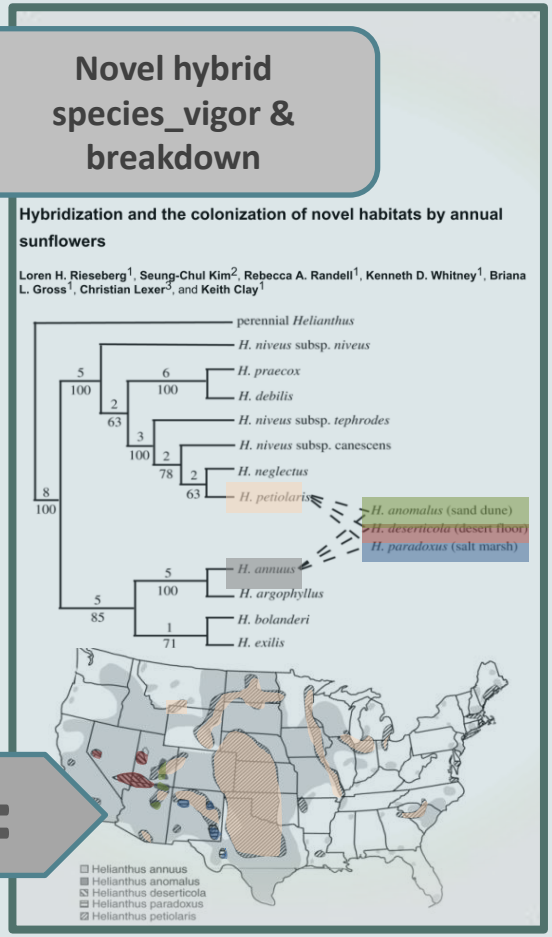

So how vulnerable is honeybush to genetic threat?

Very!

Causes of Honeybush vulnerability

Intrinsic ecological traits vs. commercial production

Genetic erosion

- Naturally low genetic diversity
- Habitat fragmentation
- Harvesting history
- Clonally cultivated populations

Genetic swamping

- Population structuring
- Genetic improvement program
- Large cultivated populations

Hybrids

- Mixed species communities
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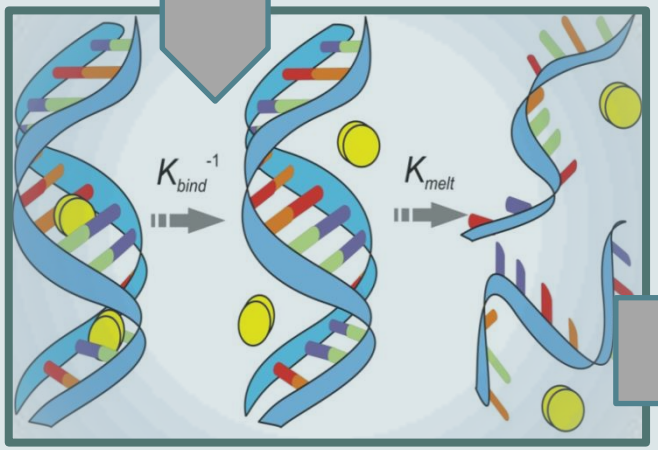
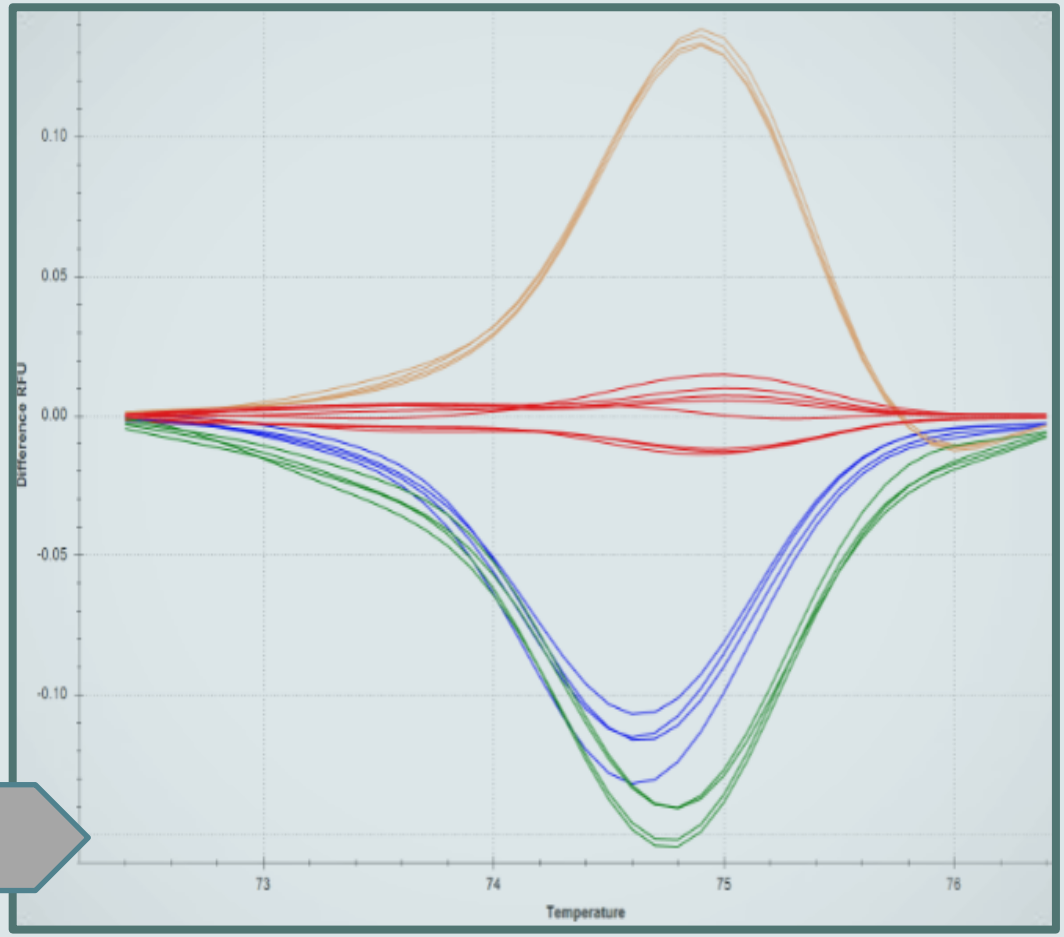
Approach to studying these genetic threats

Phylogeography & population genetics

High Resolution Melt (HRM) analysis

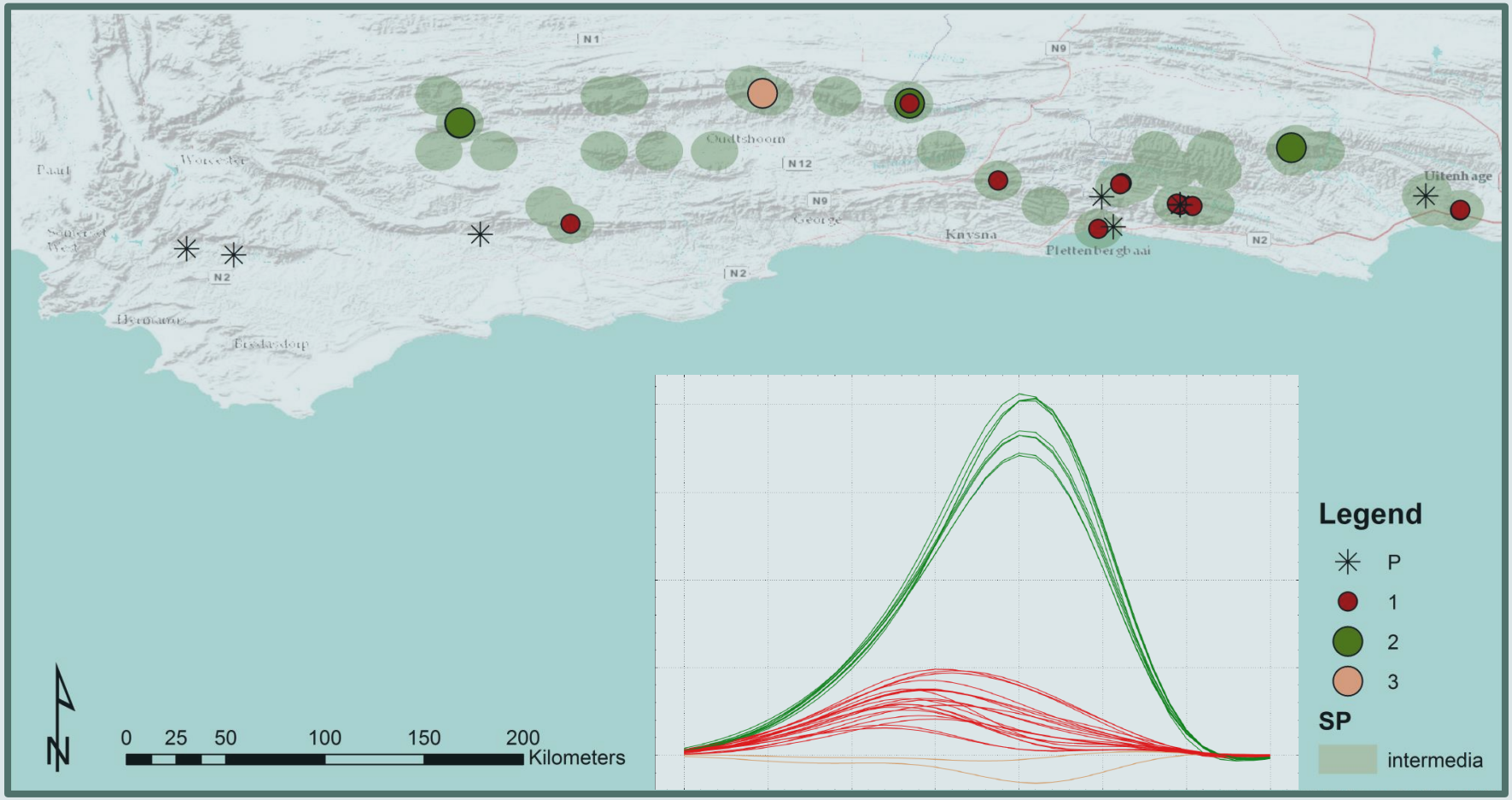
A fast and cost effective method for screening genetic variation





Cyclopia intermedia

Preliminary insights into possible population structuring



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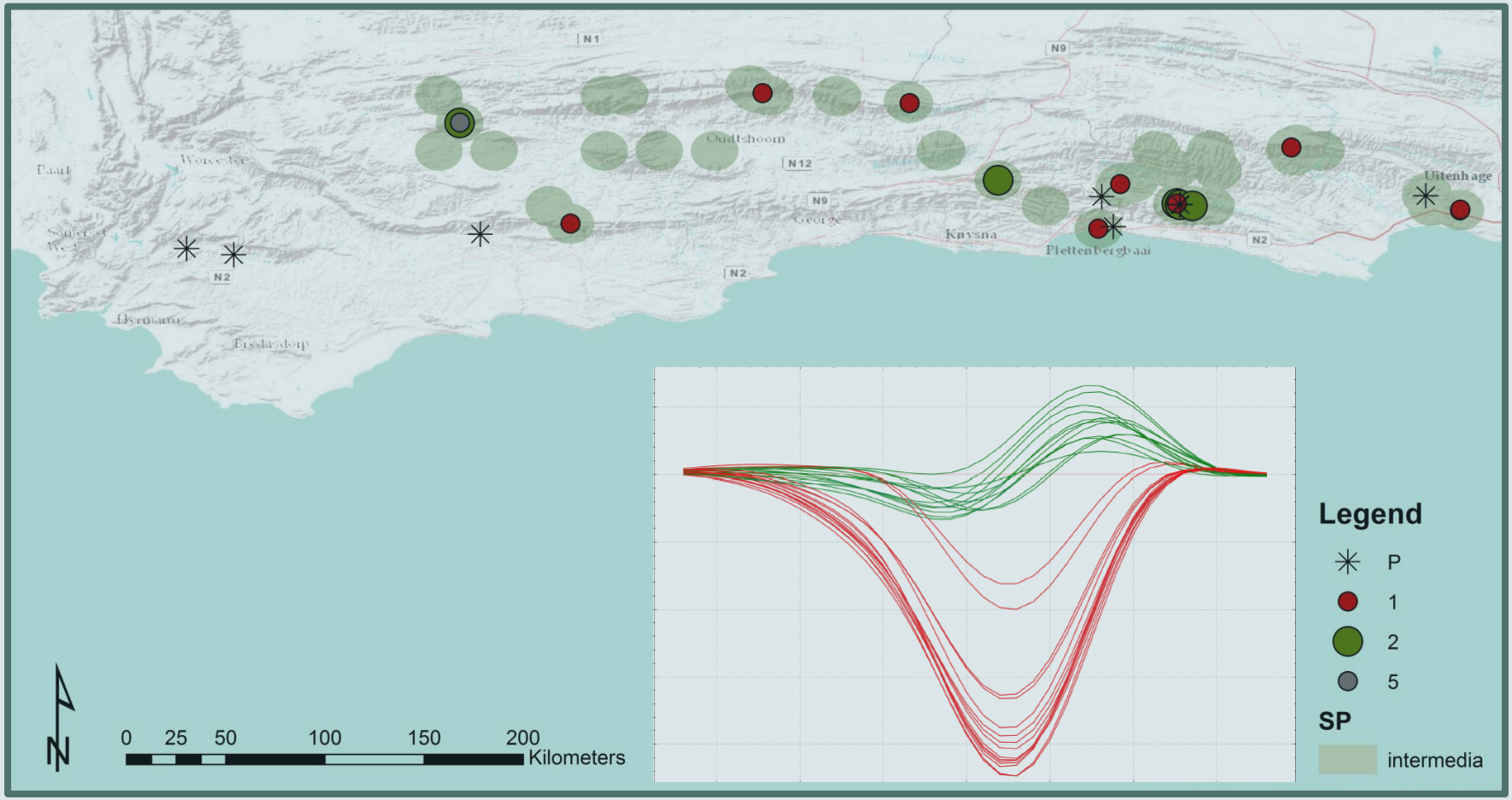

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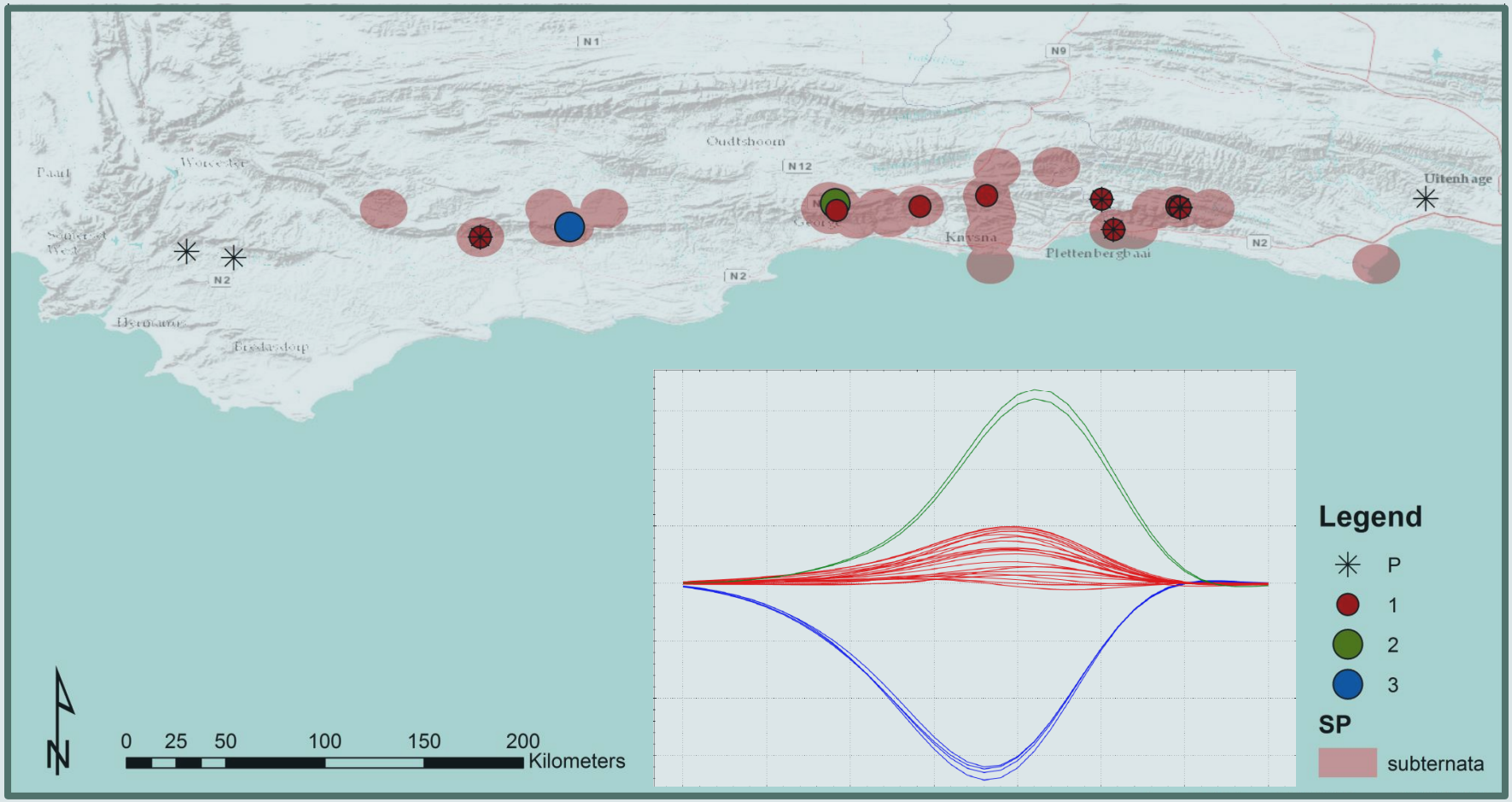

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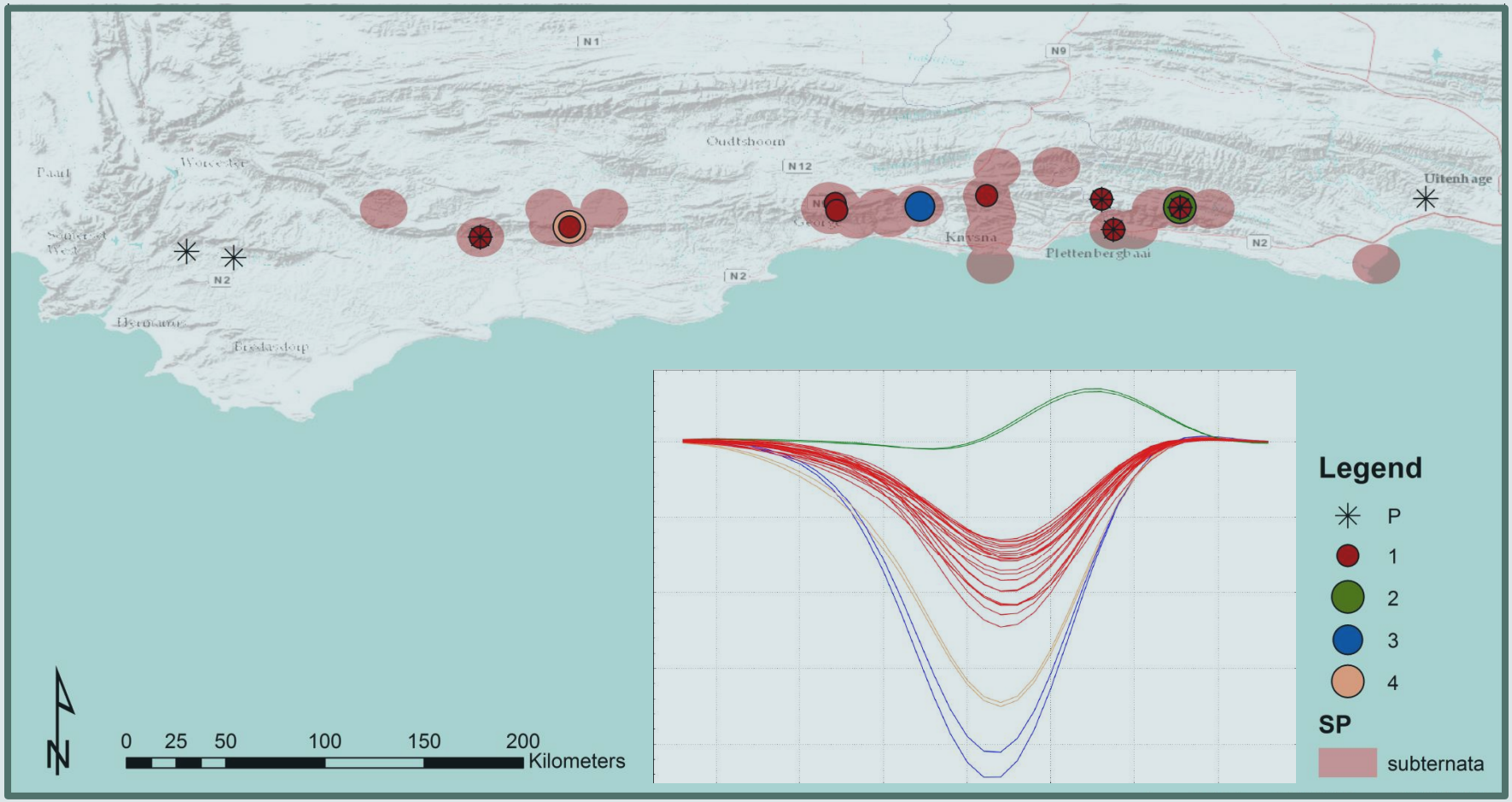

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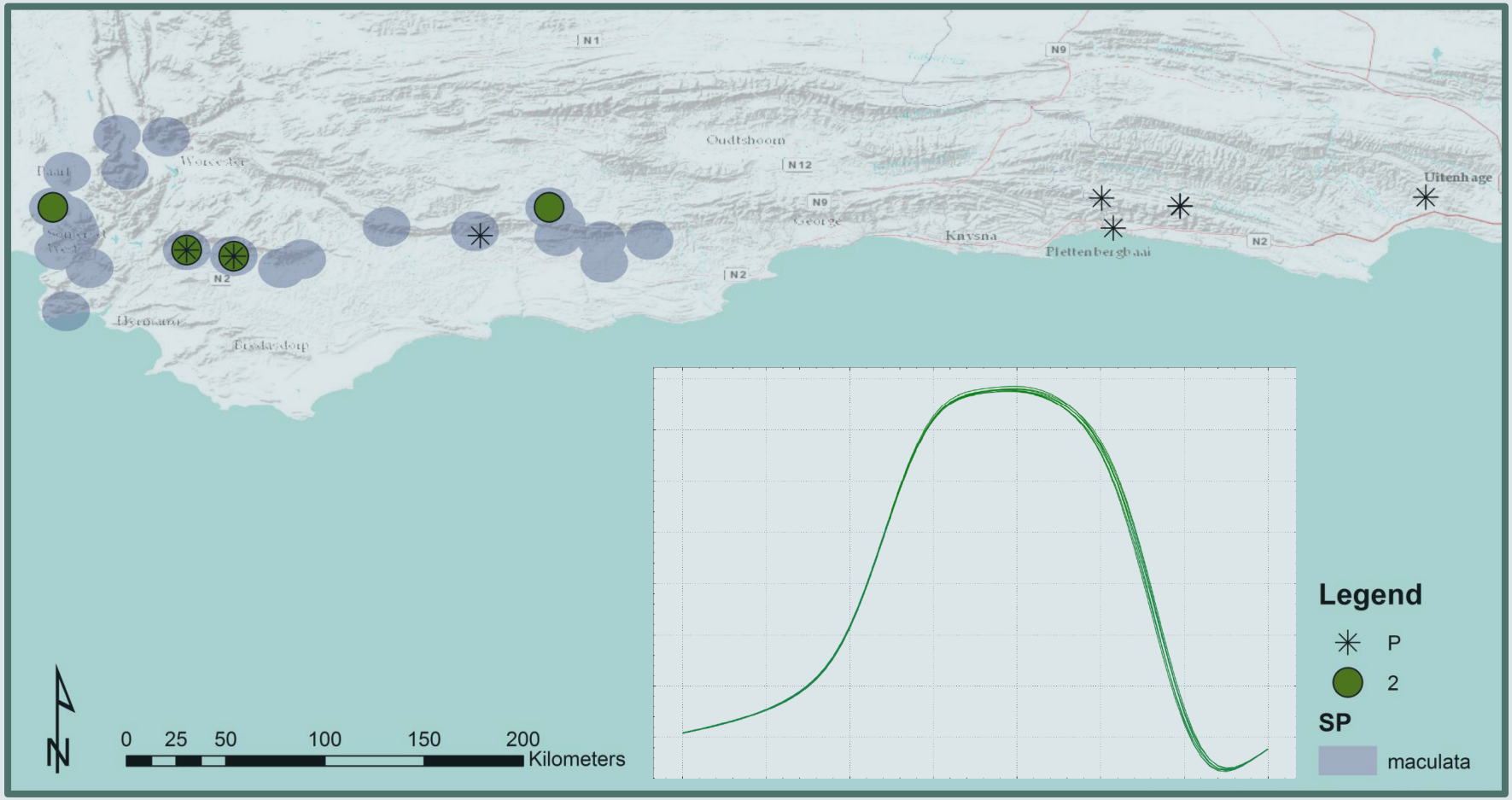

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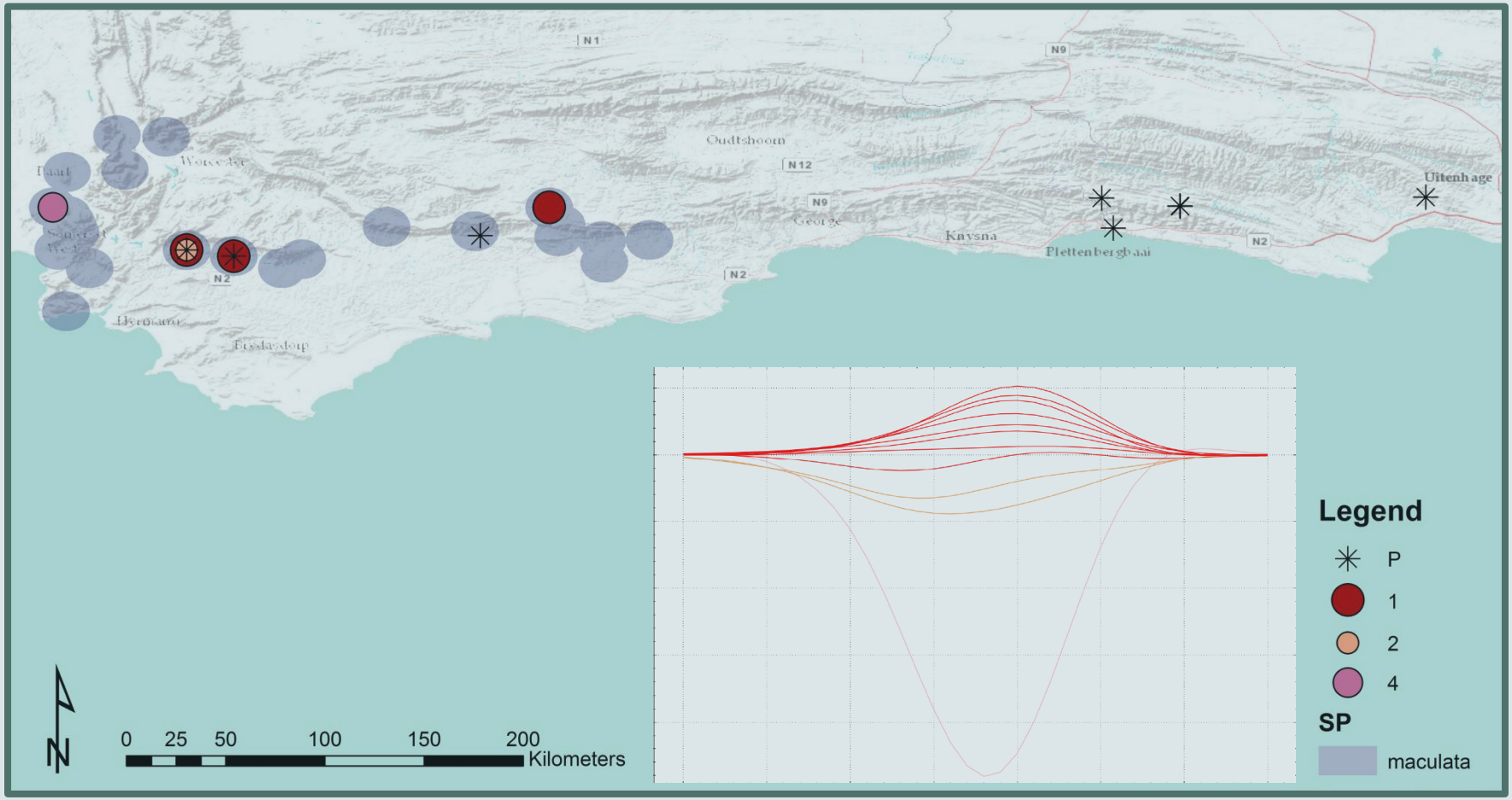
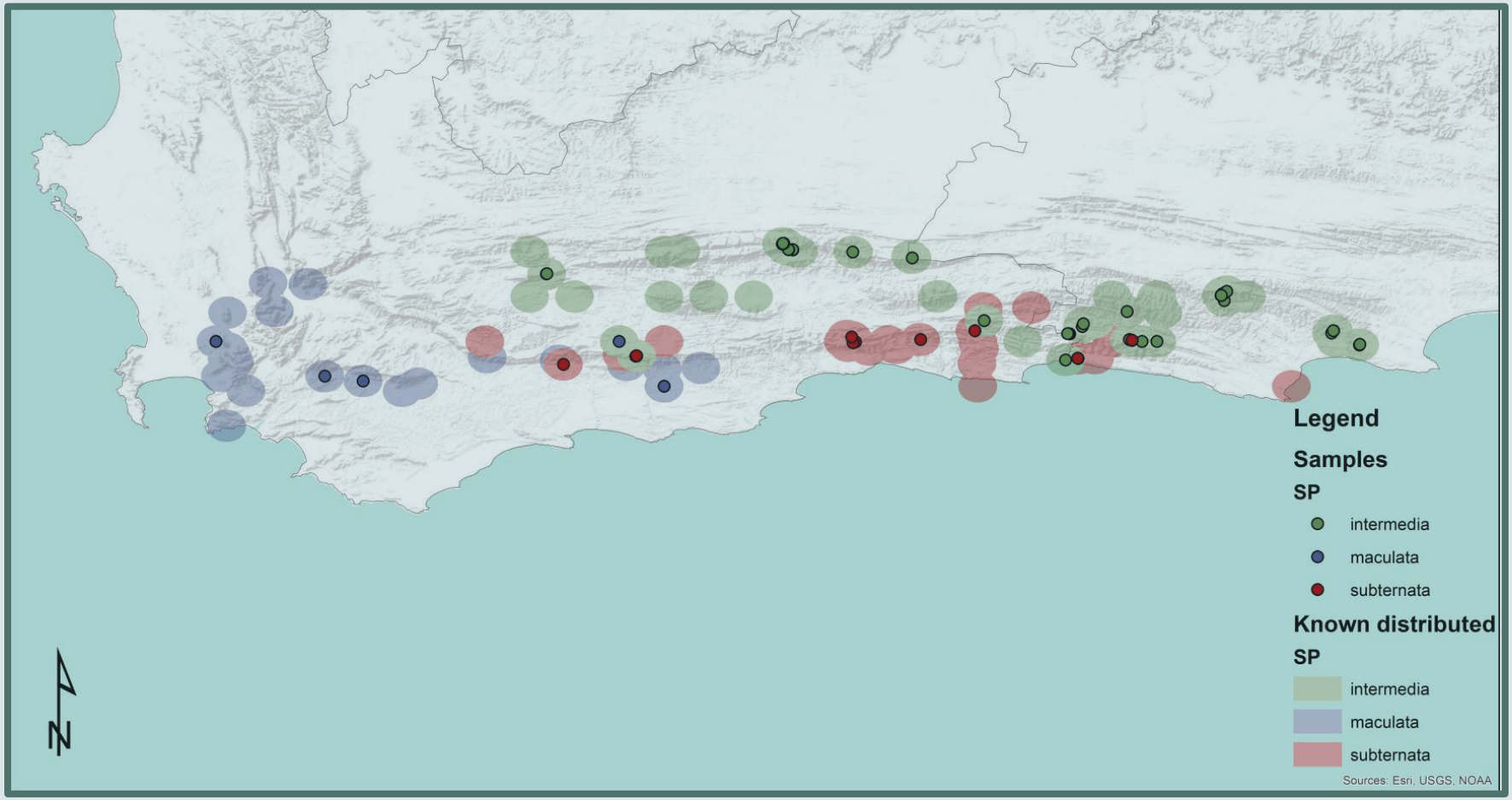


How you can help

A project is only as good as its data and this project needs samples



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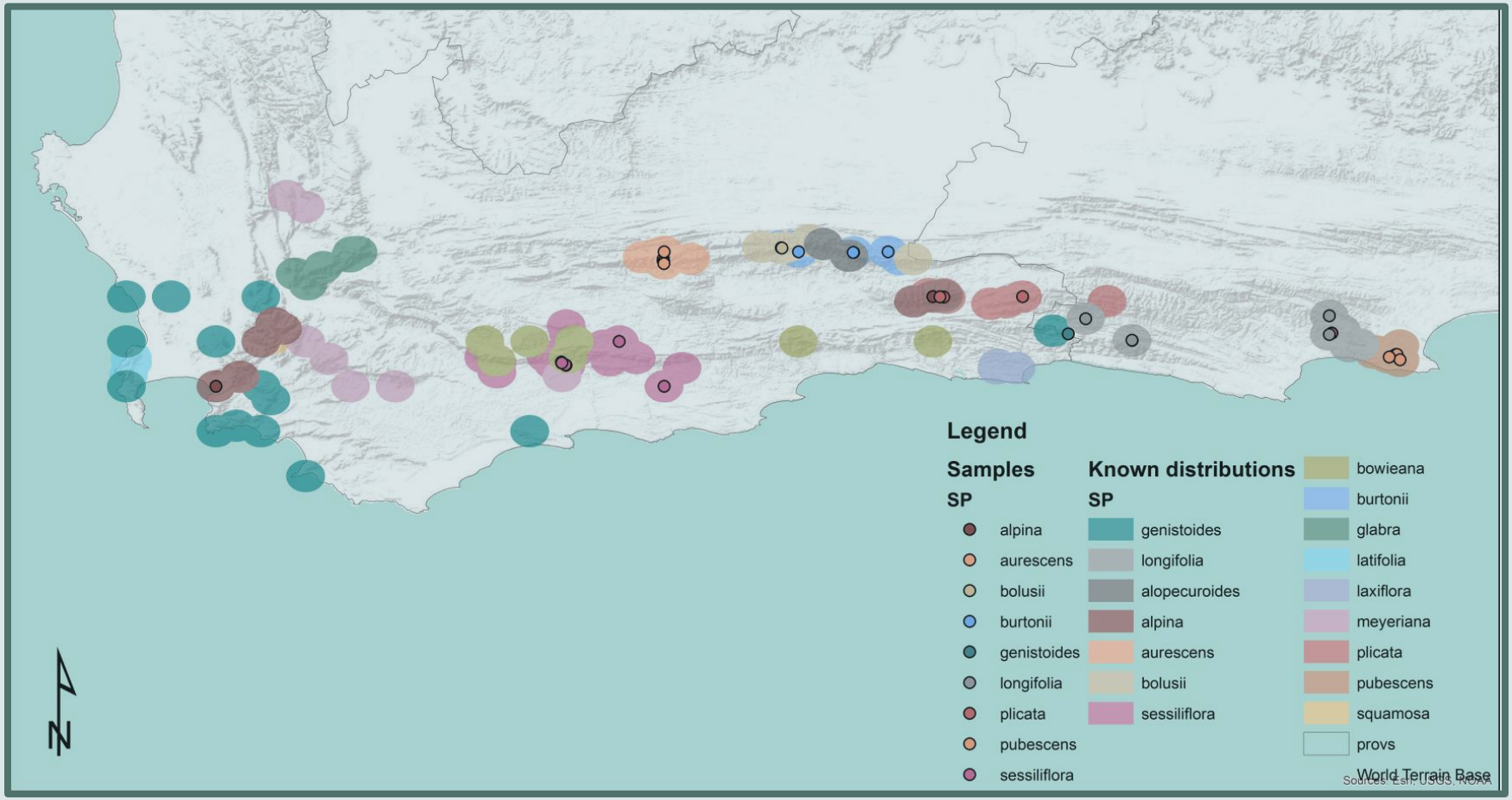

Acknowledgements and questions

The real cost of giving presentations

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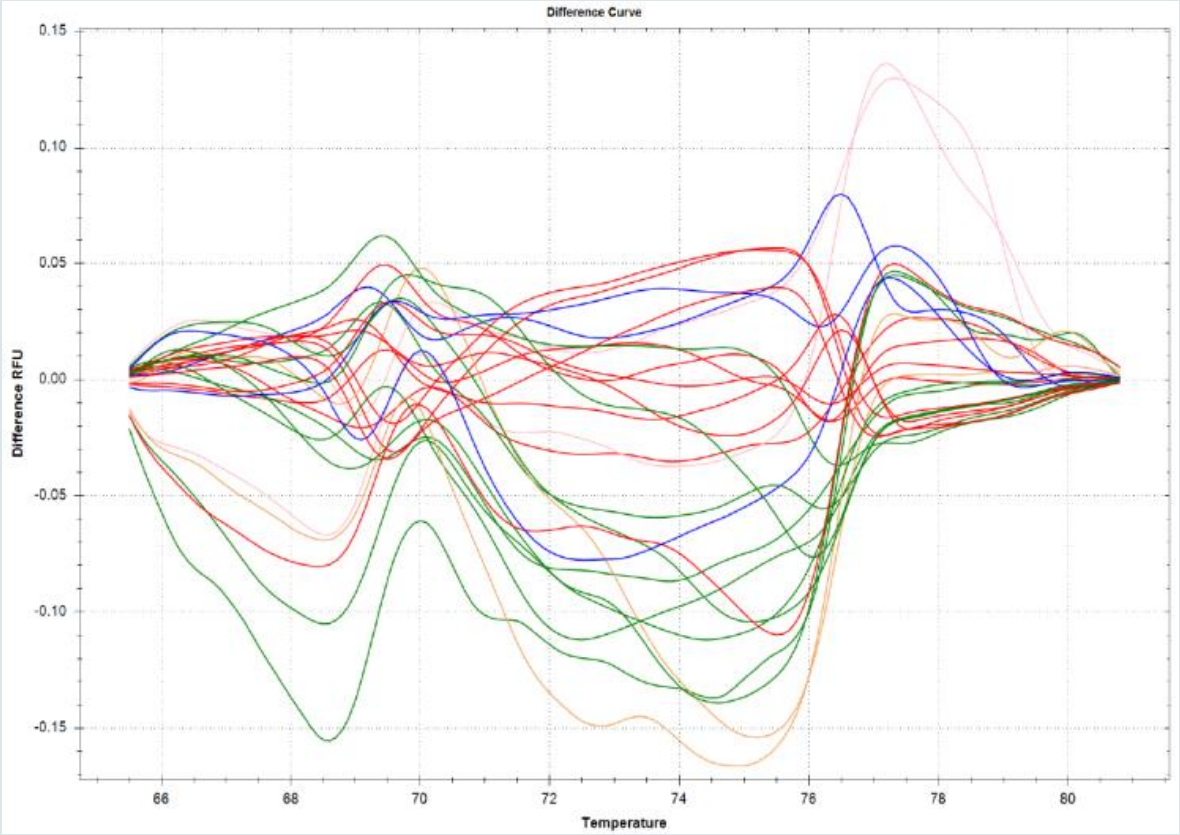
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