

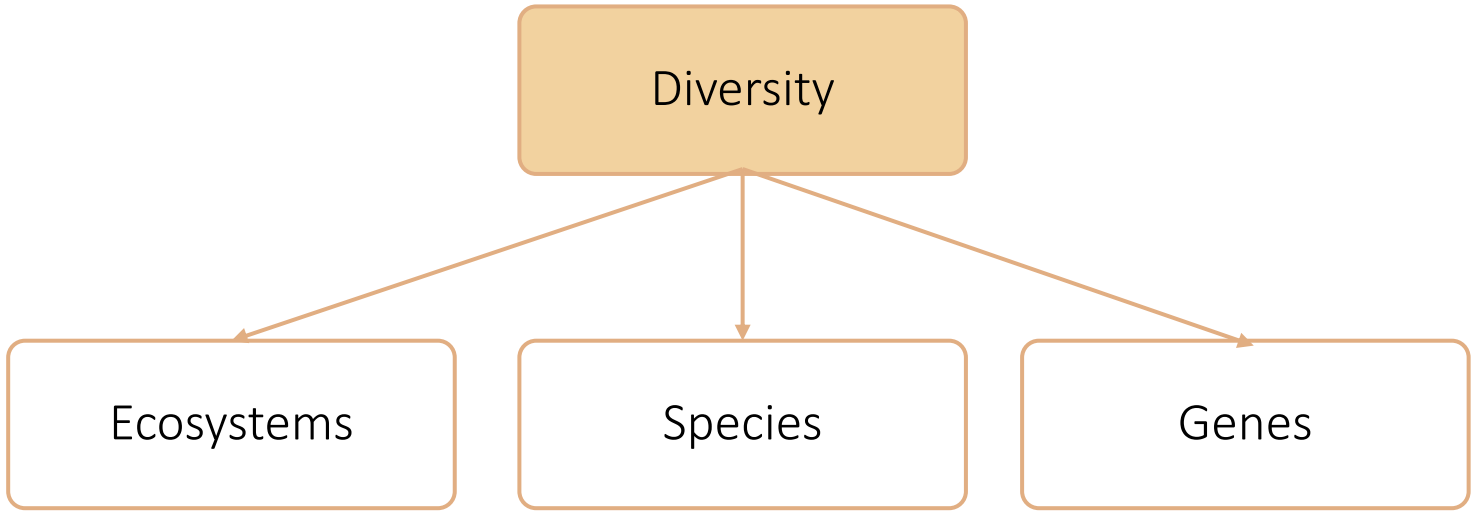
Understanding spatial patterns of intraspecific genetic and genomic diversity: an insight from the Australian Monsoonal Tropics

Maria João Paúl, Bryan Carstens, Angelica Crottini, Duarte Gonçalves, André Vicente Liz, Matthew Moreira, Pedro Tarroso, Craig Moritz, Sílvia B. Carvalho

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Introduction



Understanding spatial patterns of intraspecific diversity is of upmost importance

Genomic data is not yet available for most species

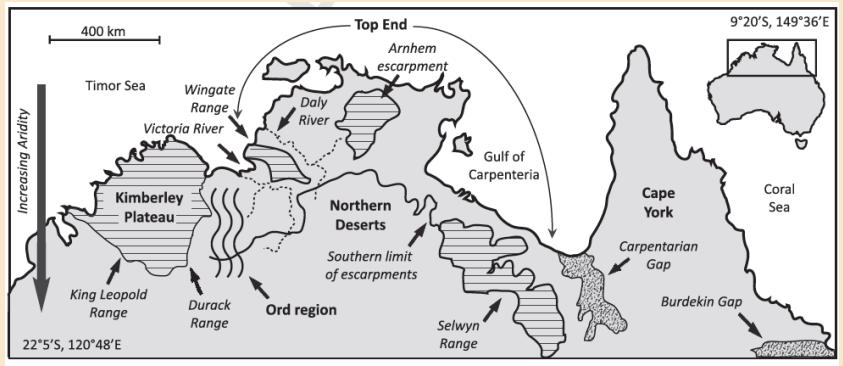
Aims

1. Assess and map mtDNA and genomic diversity for multiple co-distributed species

2. Uncover the relationship between mtDNA and genomic spatial diversity patterns

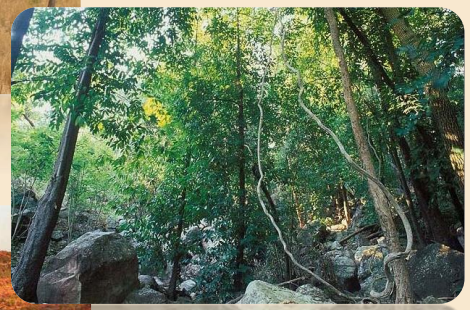
Case-study

Major biogeographic barriers



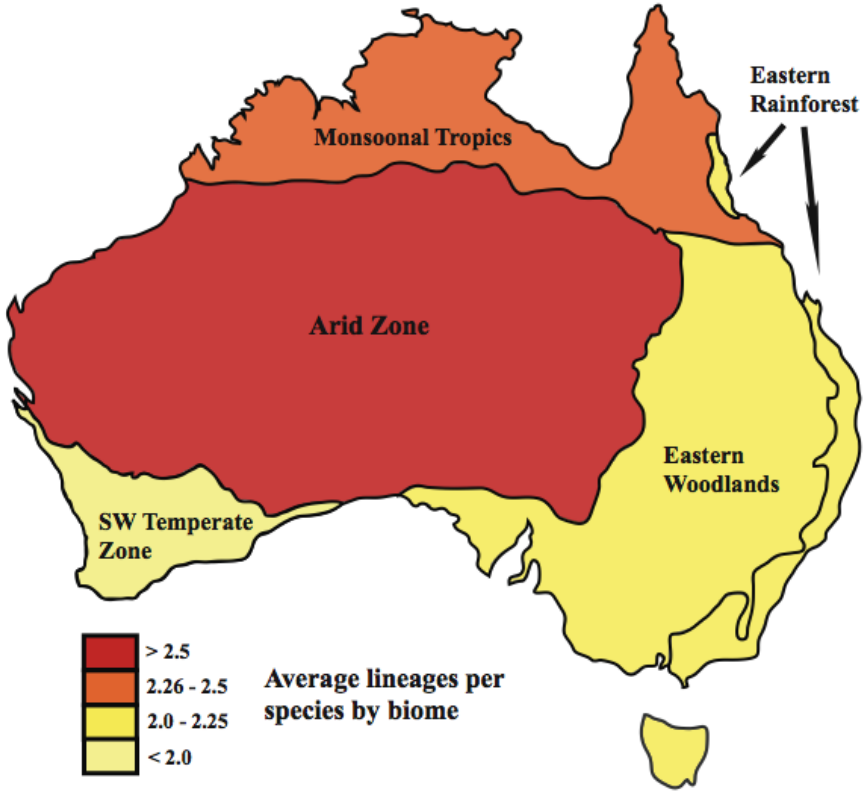
Catullo et al. 2013







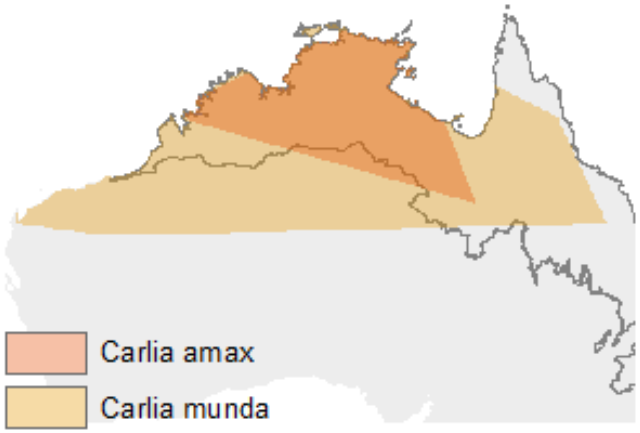
Reptiles in the **Australian Monsoonal Tropics** (AMT)







Case-study

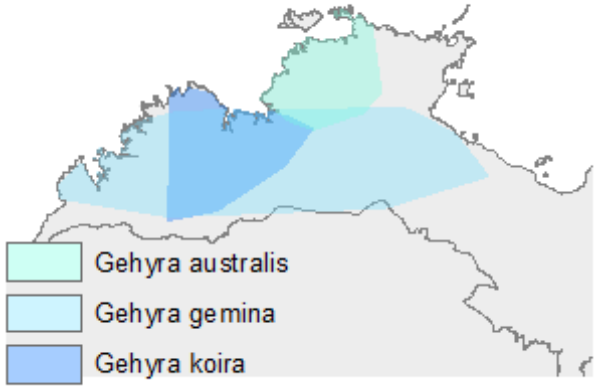


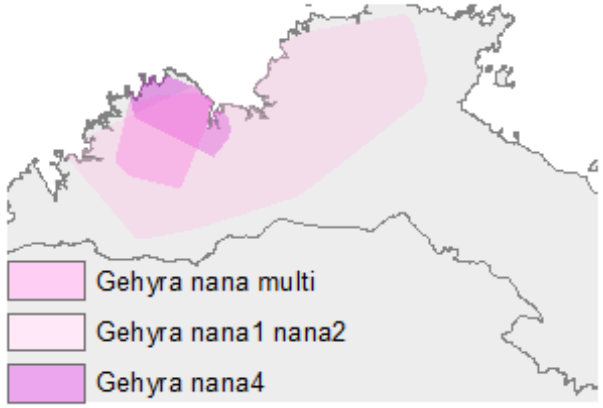
2 species



Carlia

Reptiles in the **Australian Monsoonal Tropics** (AMT)



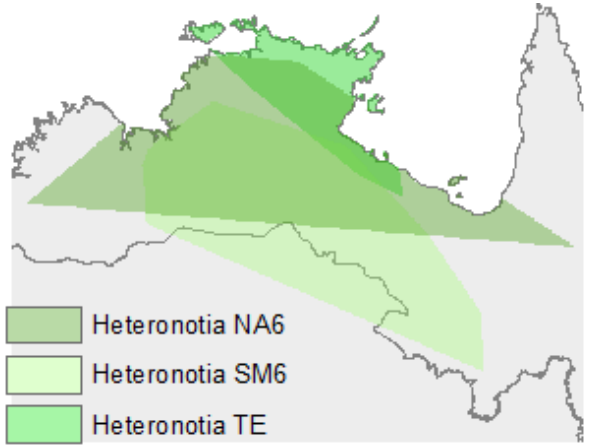


9 species

Gehyra



Heteronotia



Methods

1

Compile and filter data

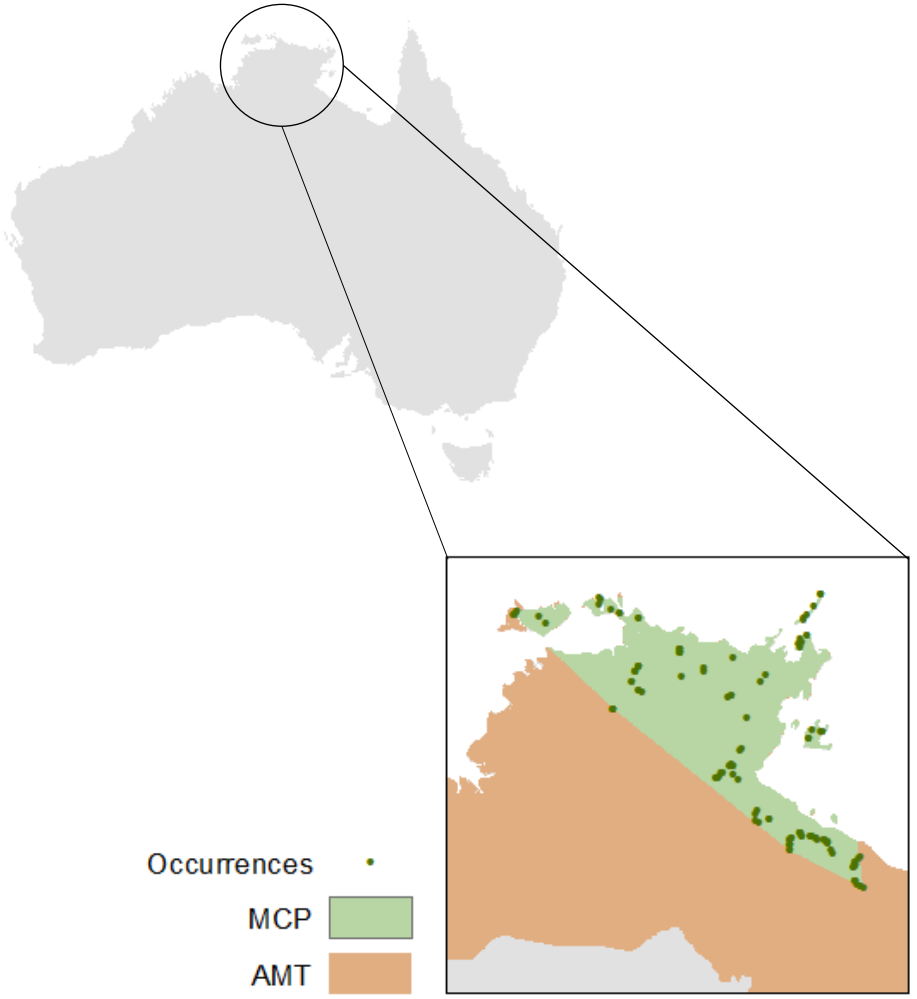
> 10 samples per species, whose distribution represents a significant part of the species' distribution range:

- Mitochondrial DNA
- Single nucleotide polymorphism (SNP)

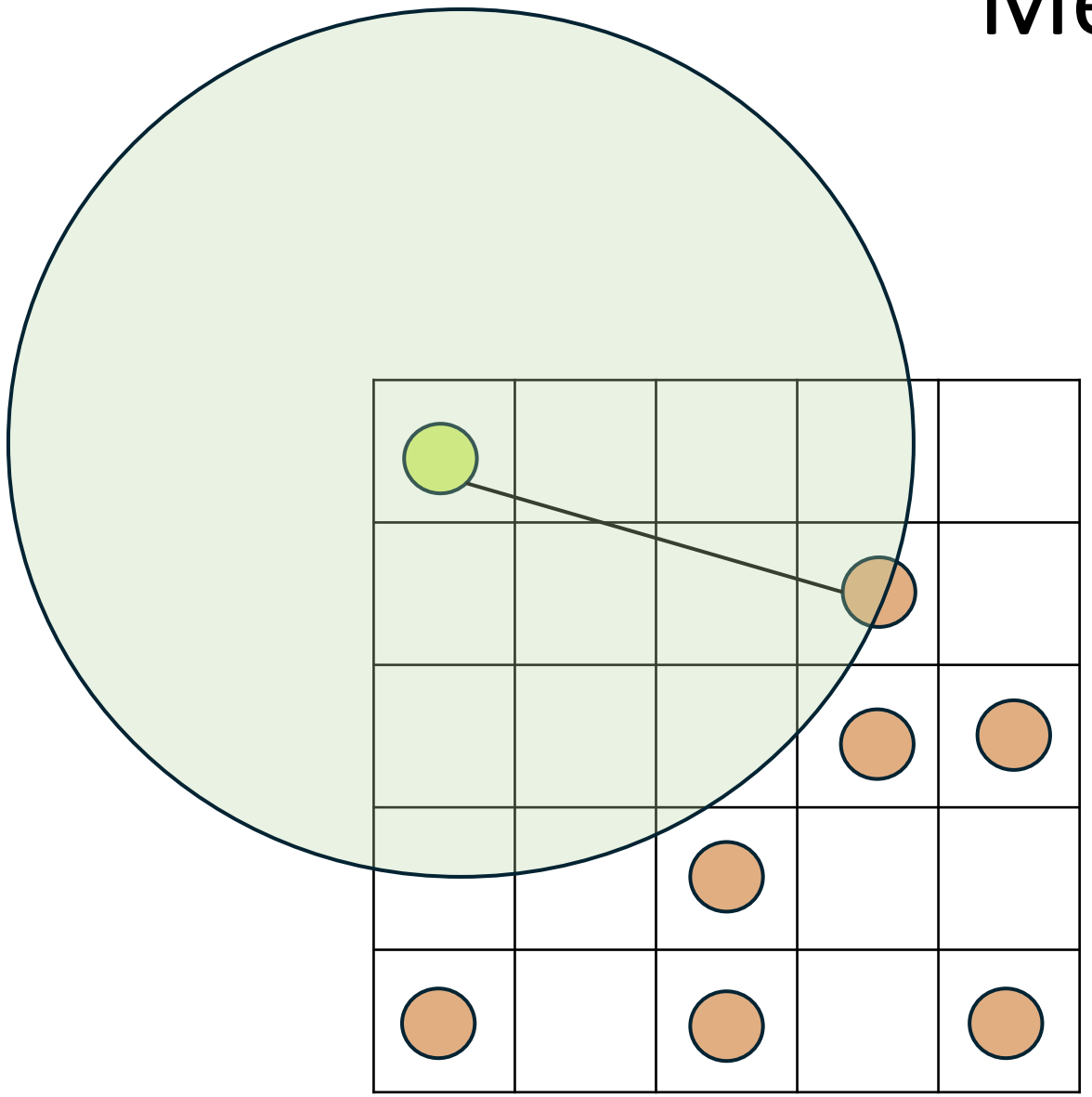
2

Map species' distribution ranges

- Minimum convex polygon (MCP)



Methods



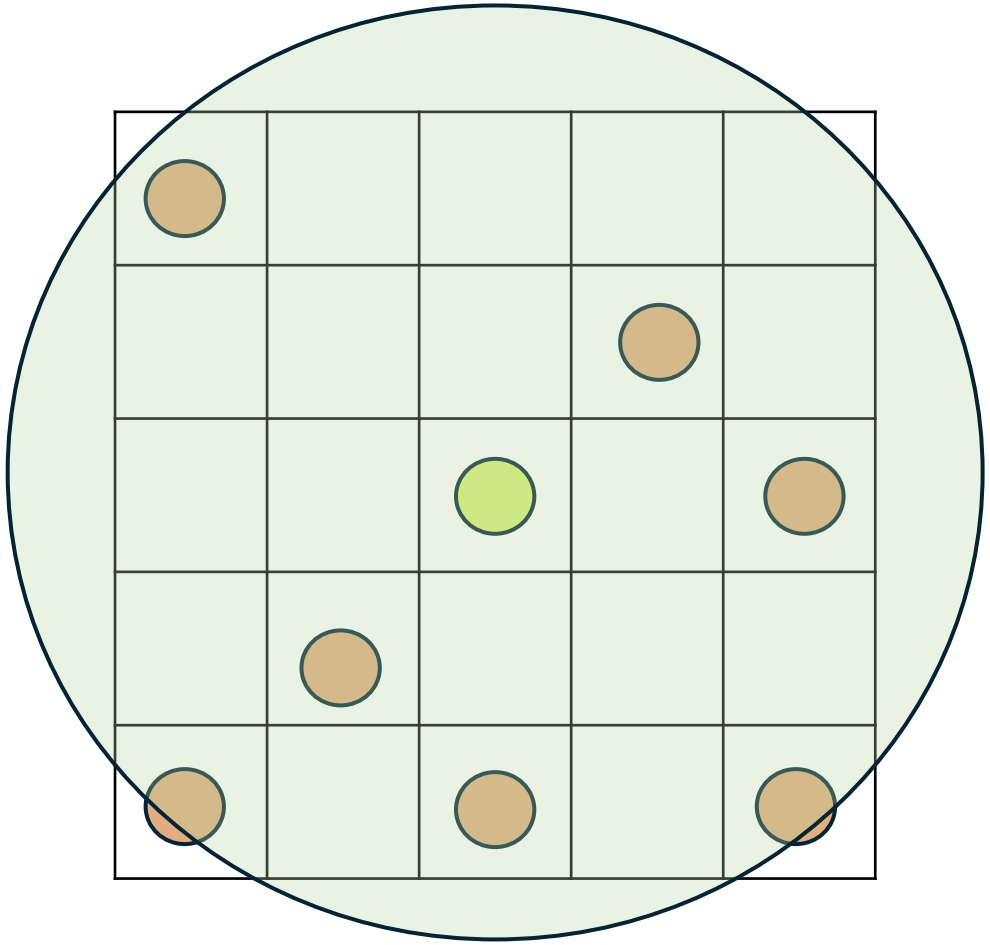
3

Estimate and map intraspecific diversity

Diversity measures:

- mtDNA - Mean pairwise nucleotide diversity (MPND)

Methods



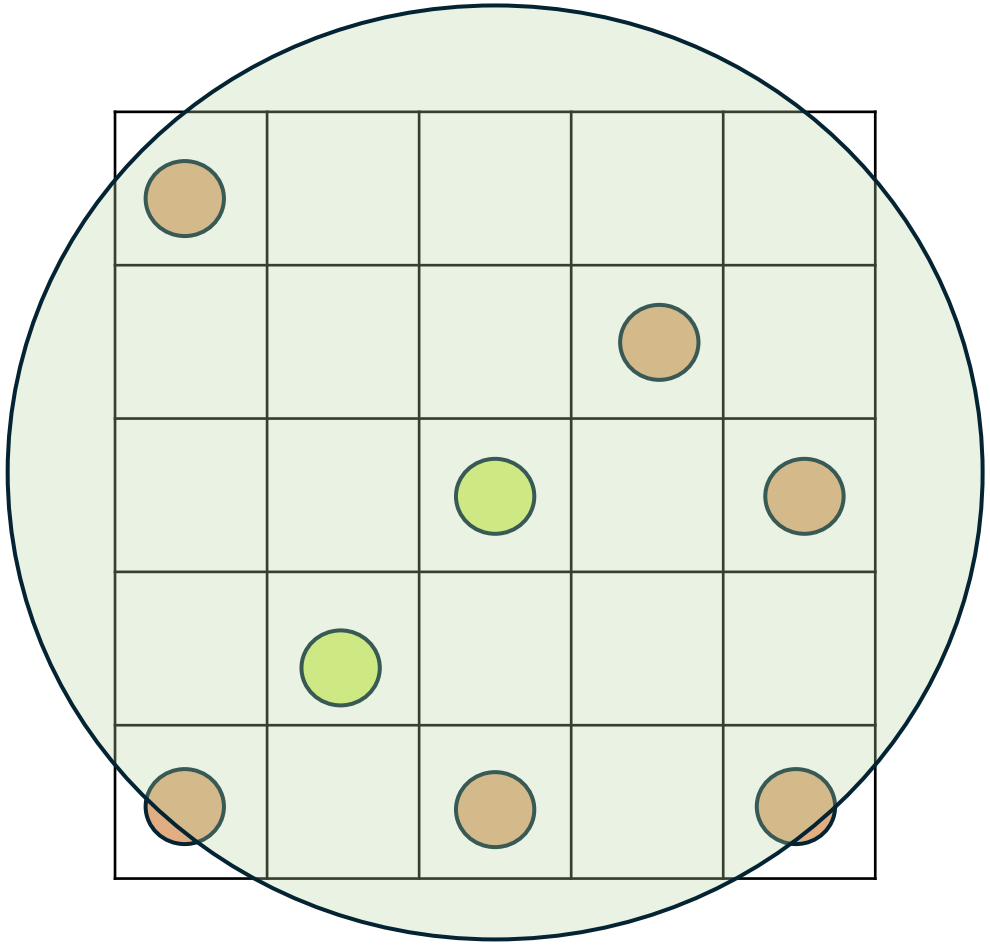
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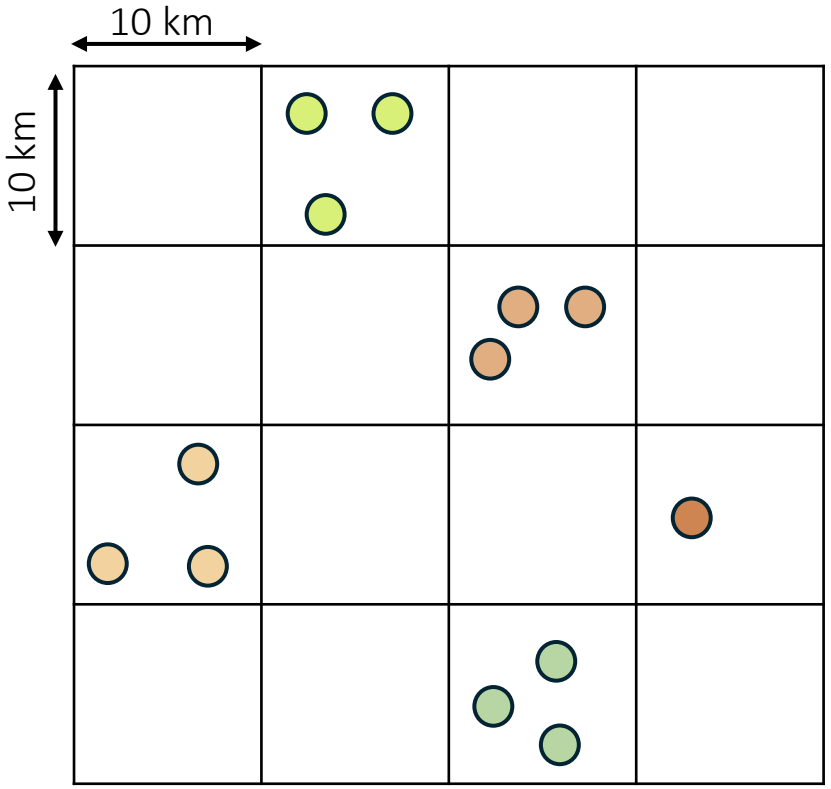
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Methods



3

Estimate and map intraspecific diversity

Diversity measures:

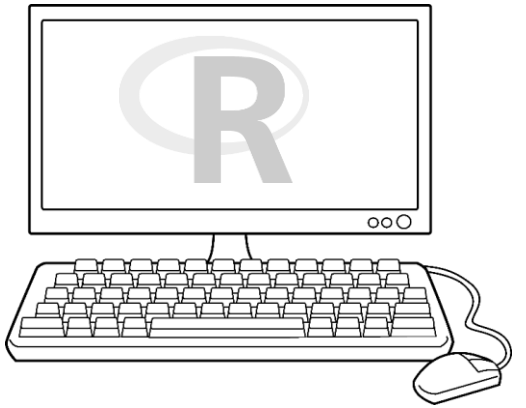
- mtDNA - Mean pairwise nucleotide diversity (MPND)
- SNPs - Individual heterozygosity

Interpolation

4

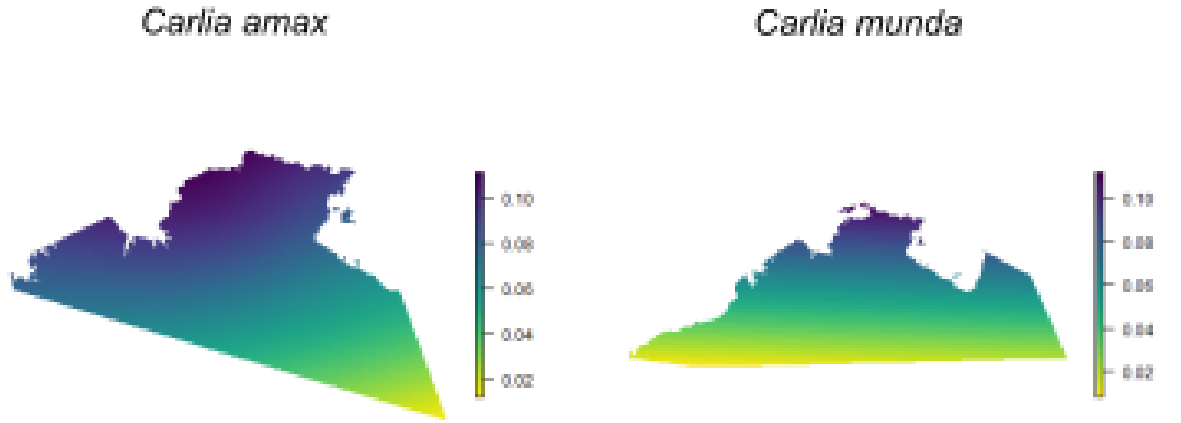
Statistical analyses

Linear regression

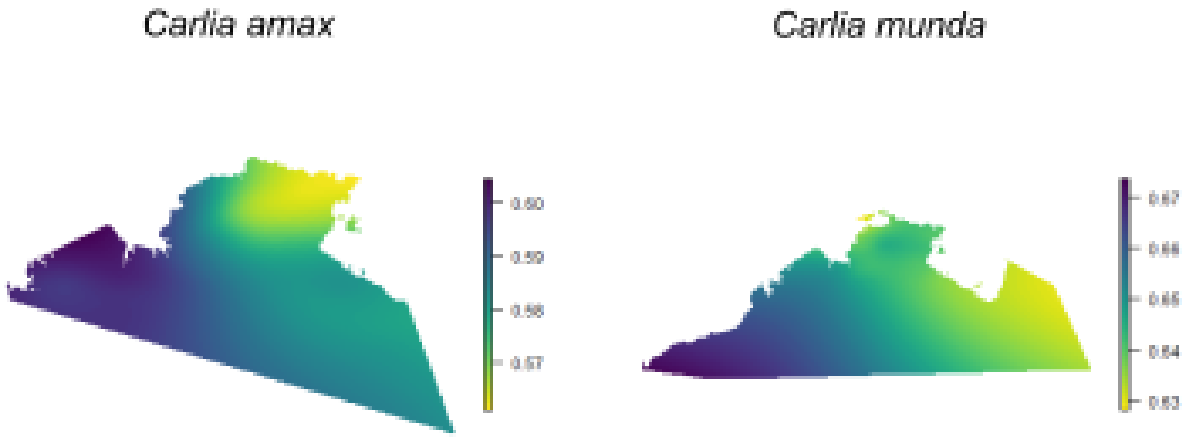


Results

Spatial patterns of mt **nucleotide diversity** within the range of each species

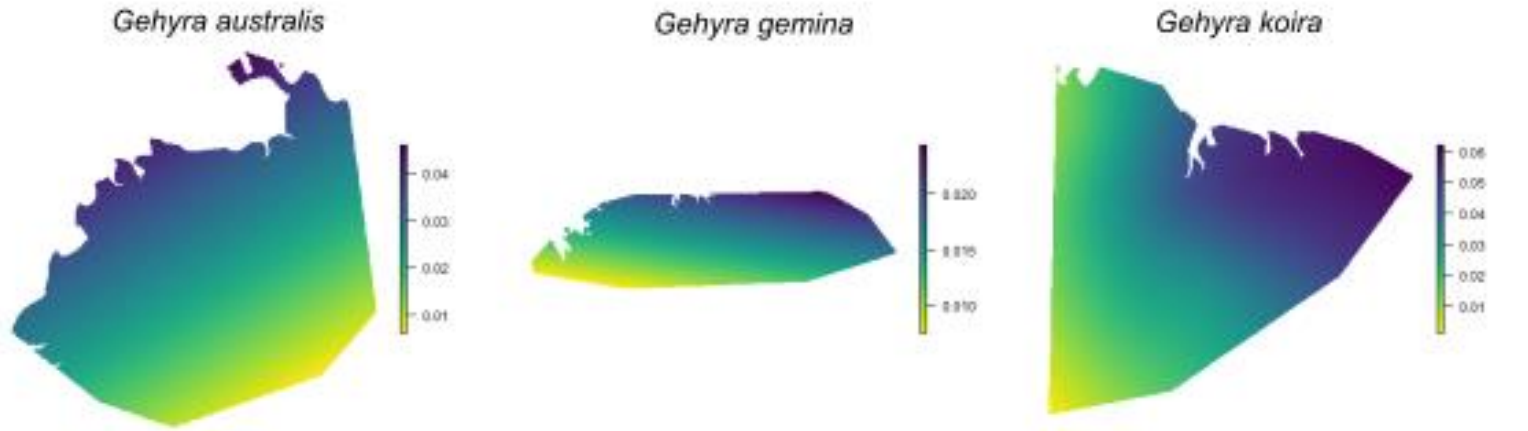


Spatial patterns of SNP **individual heterozygosity** within the range of each species

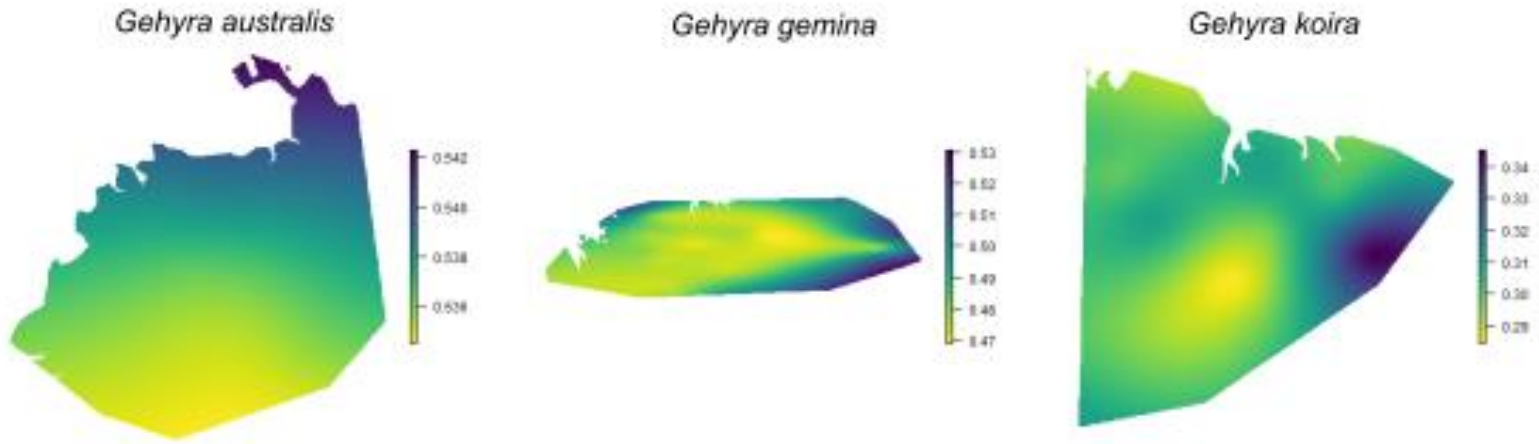


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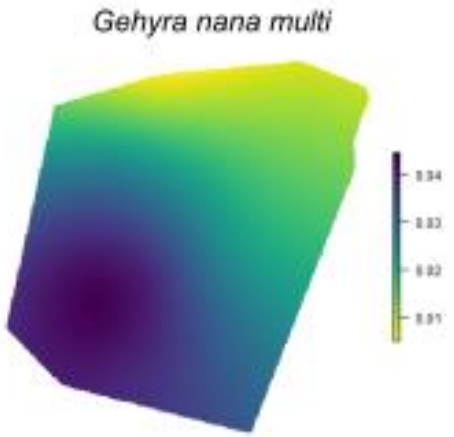


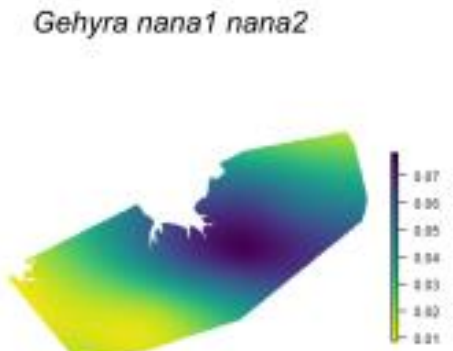
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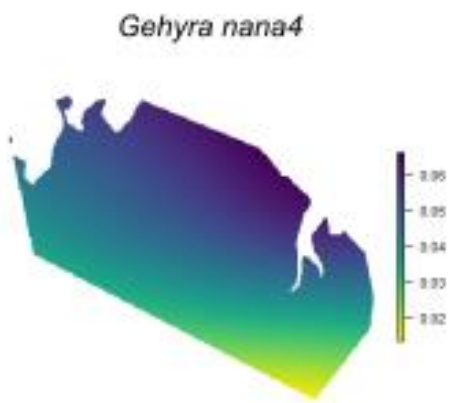


Results

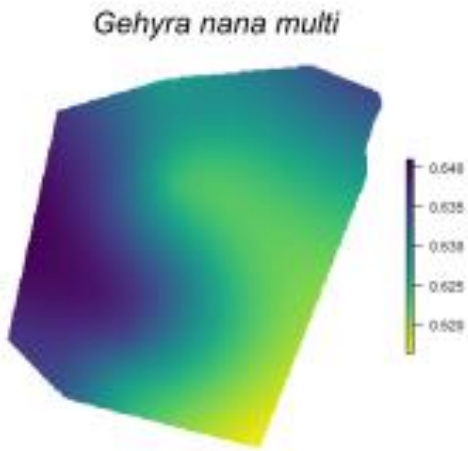
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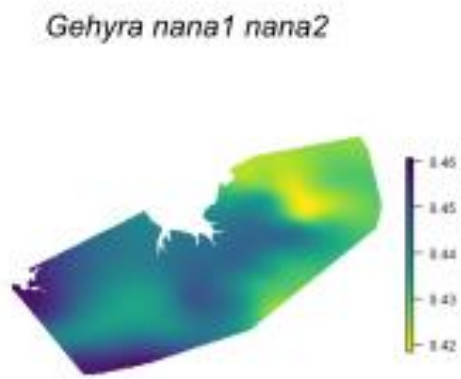


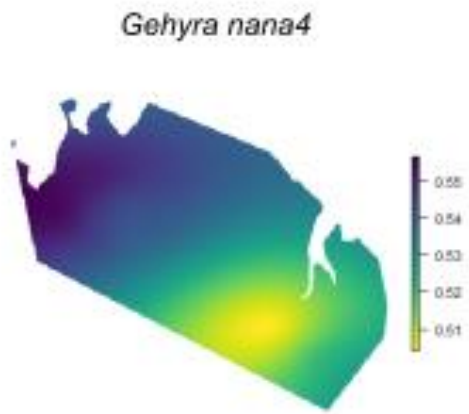




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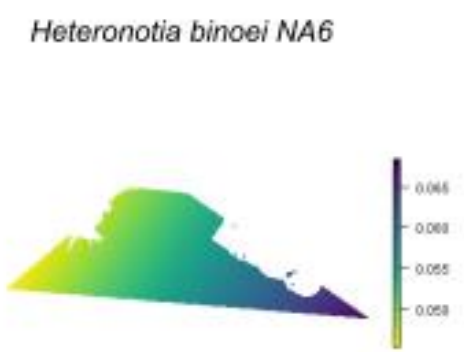


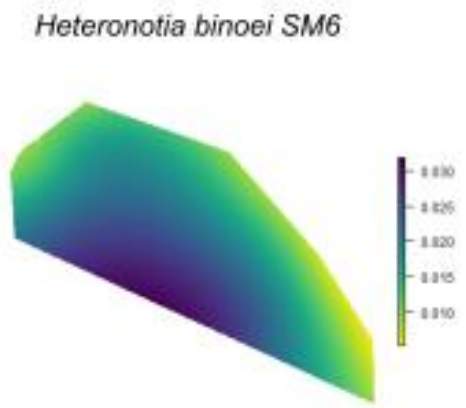


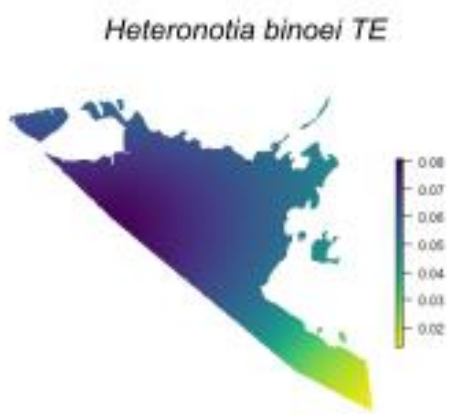


Results

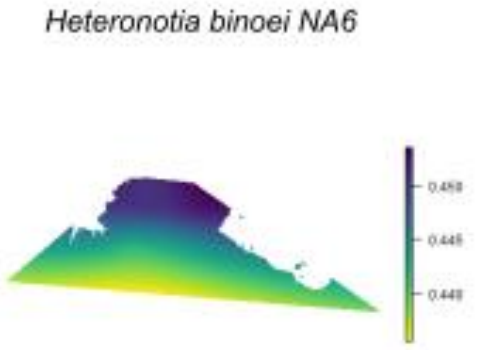
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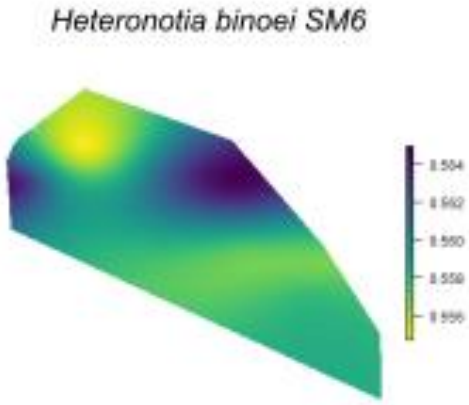


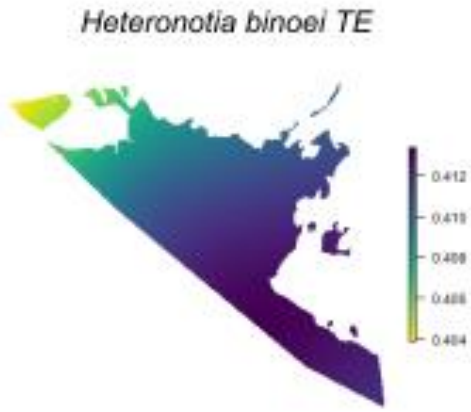




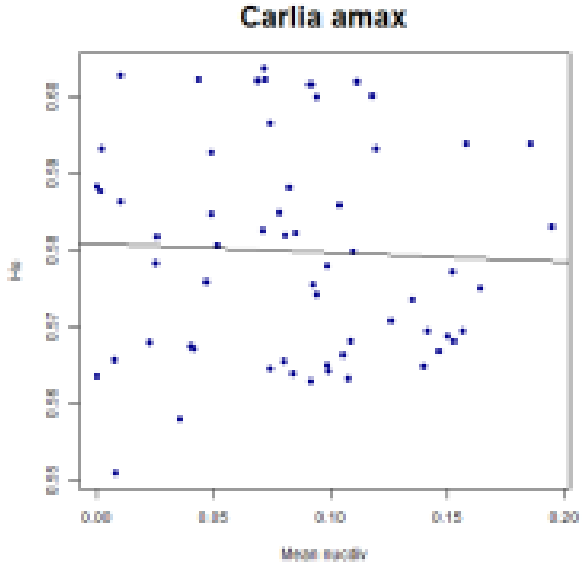
Spatial patterns of SNP **individual heterozygosity** within the range of each species



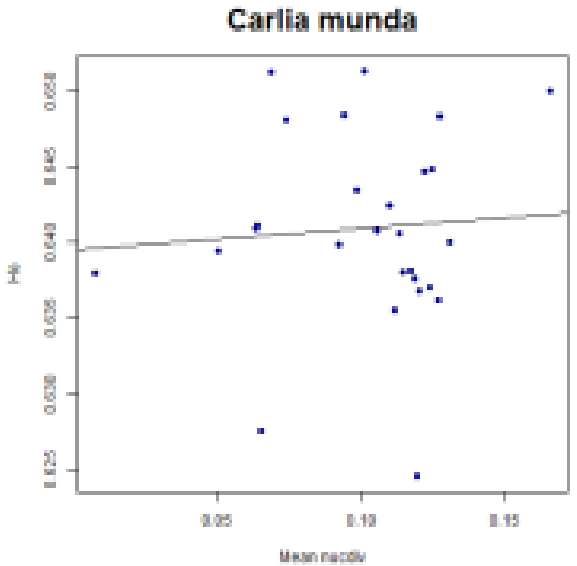




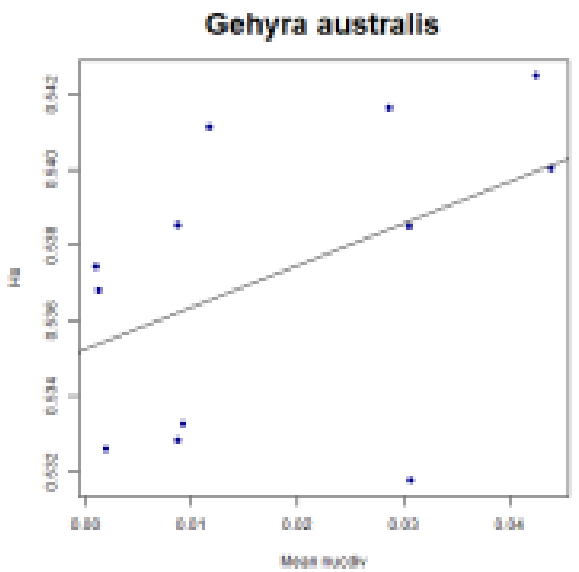
Linear regression between mt nucleotide diversity and SNP heterozygosity



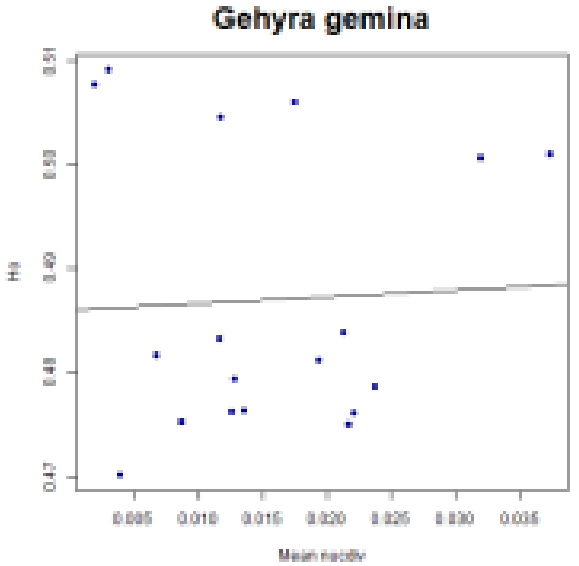
R-squared: 0.001633



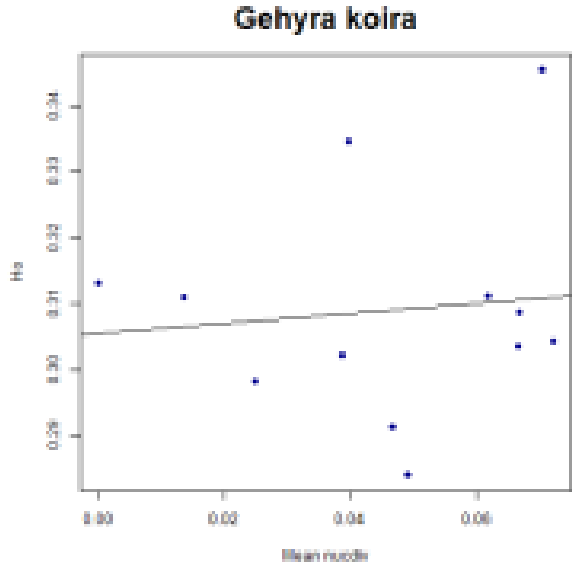
R-squared: 0.005264



R-squared: 0.216

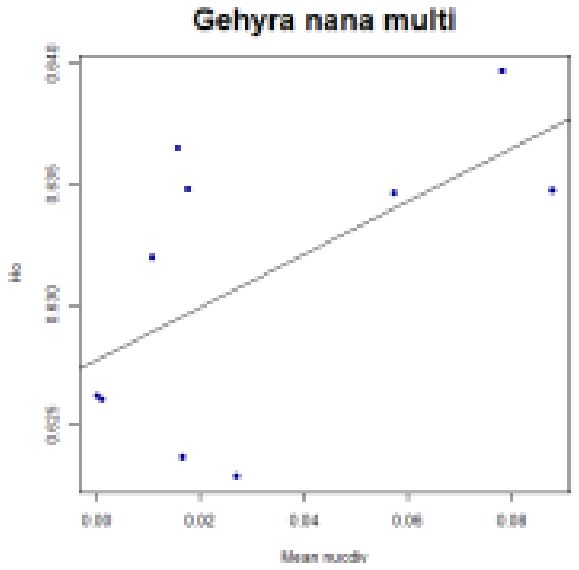


R-squared: 0.002068

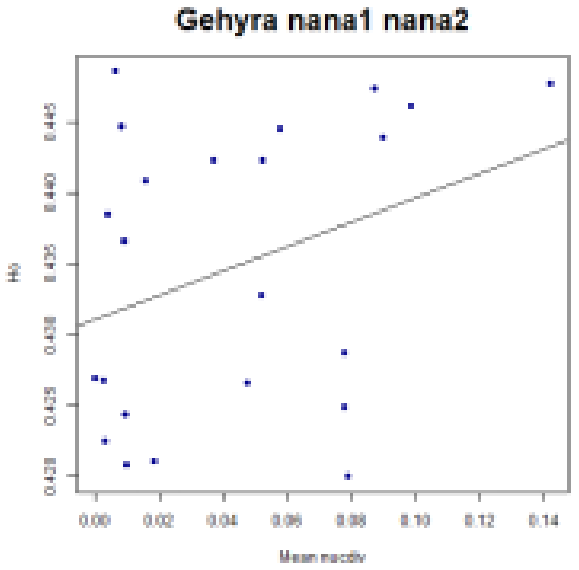


R-squared: 0.01078

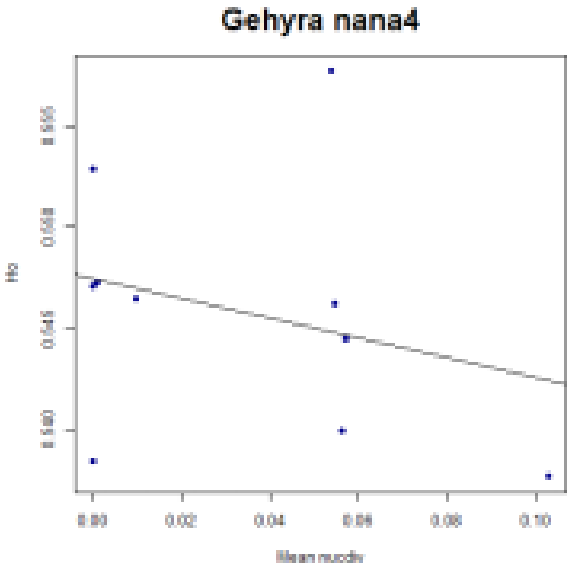
Linear regression between mt nucleotide diversity and SNP heterozygosity



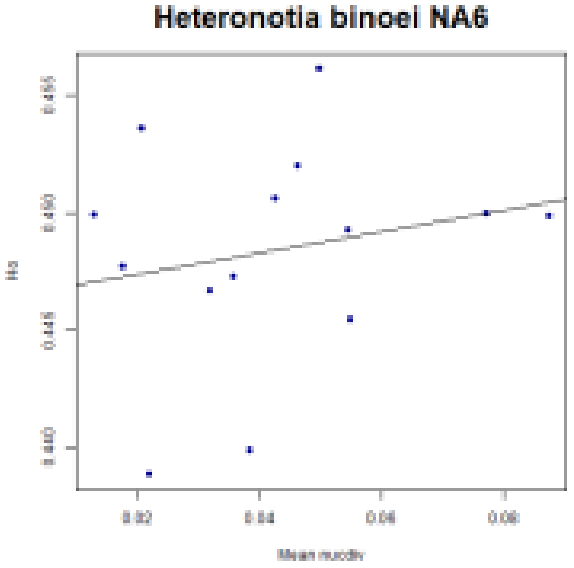
R-squared: 0.3465



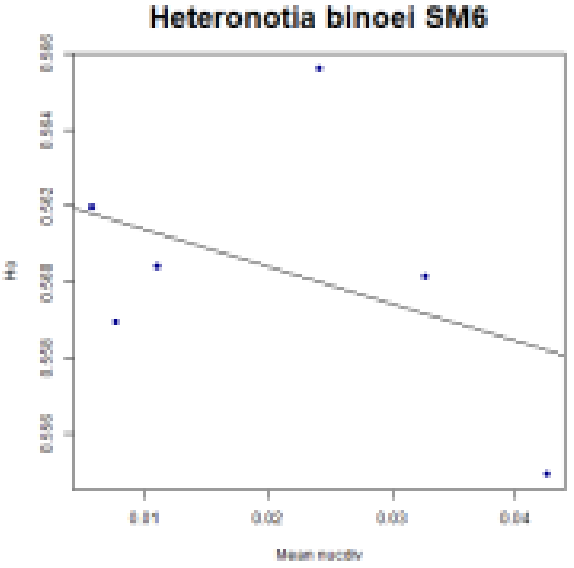
R-squared: 0.1126



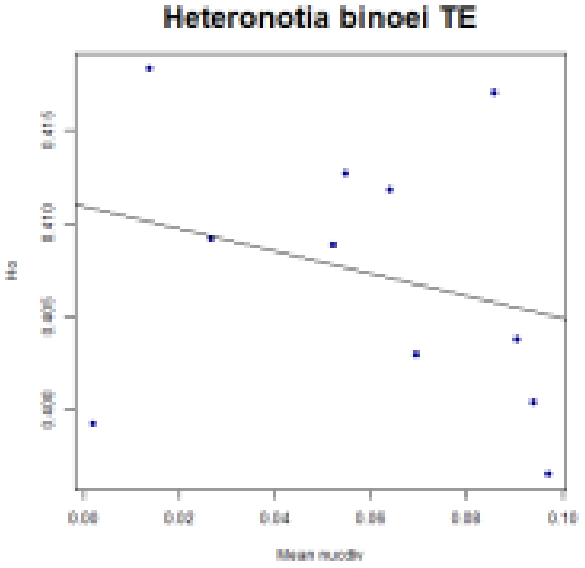
R-squared: 0.08045



R-squared: 0.04377



R-squared: 0.1742



R-squared: 0.07373

Final remarks

No clear generalized spatial patterns of intraspecific mt nucleotide diversity and SNP heterozygosity

Lack of congruence and relationship between spatial patterns intraspecific mt nucleotide diversity and SNP heterozygosity

Ongoing: Estimate the relationship between spatial patterns of mtDNA and genomic beta diversity

Urgent need for a better understanding of the relationship between genetic and genomic spatial diversity patterns due to its importance for spatial conservation planning

Acknowledgments

SUPERVISORS



Sílvia Carvalho



Craig Moritz

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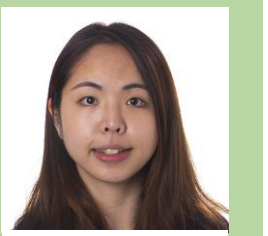
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Robyn Shaw



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Ching Ching Lau



Mitzy Pepper



Renee Catullo



Jessica Fenker



Sally Potter

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