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A PHYLOGENETIC AND ECOLOGICAL STUDY OF SONGBIRDS EVOLUTIONARY DIVERGENCE:

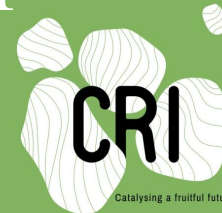


PHYLOGENETIC STUDY OF THE DIVERGENCE OF
MASCARENE MARTENS POPULATIONS
&
MATERNAL AND HABITAT QUALITY EFFECT IN THE
REPRODUCTIVE SUCCESS OF GREAT TITS



INTERNSHIP DEFENSE

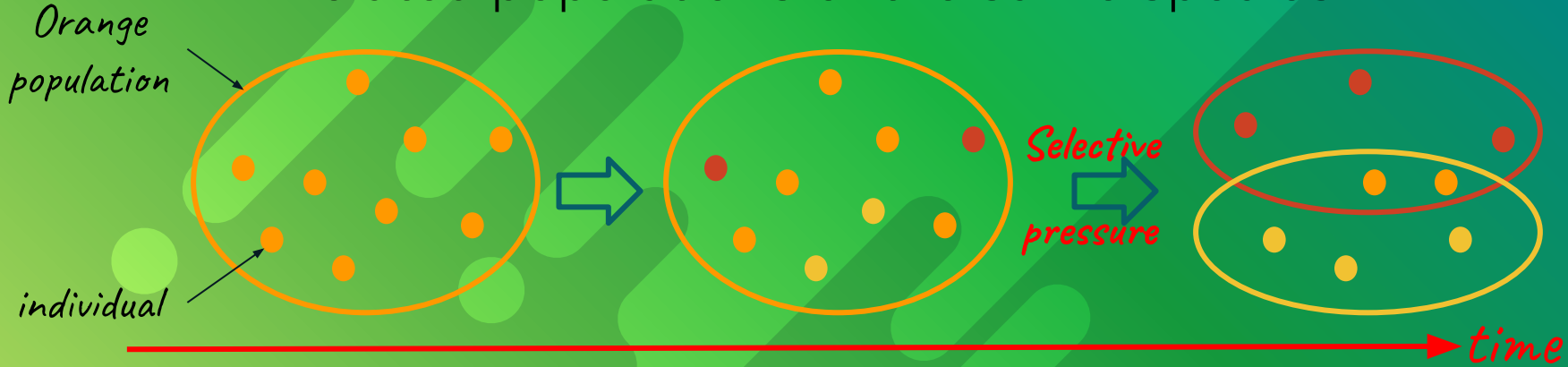
25/01/2021 To 28/05/2021



Evolutionary Divergence

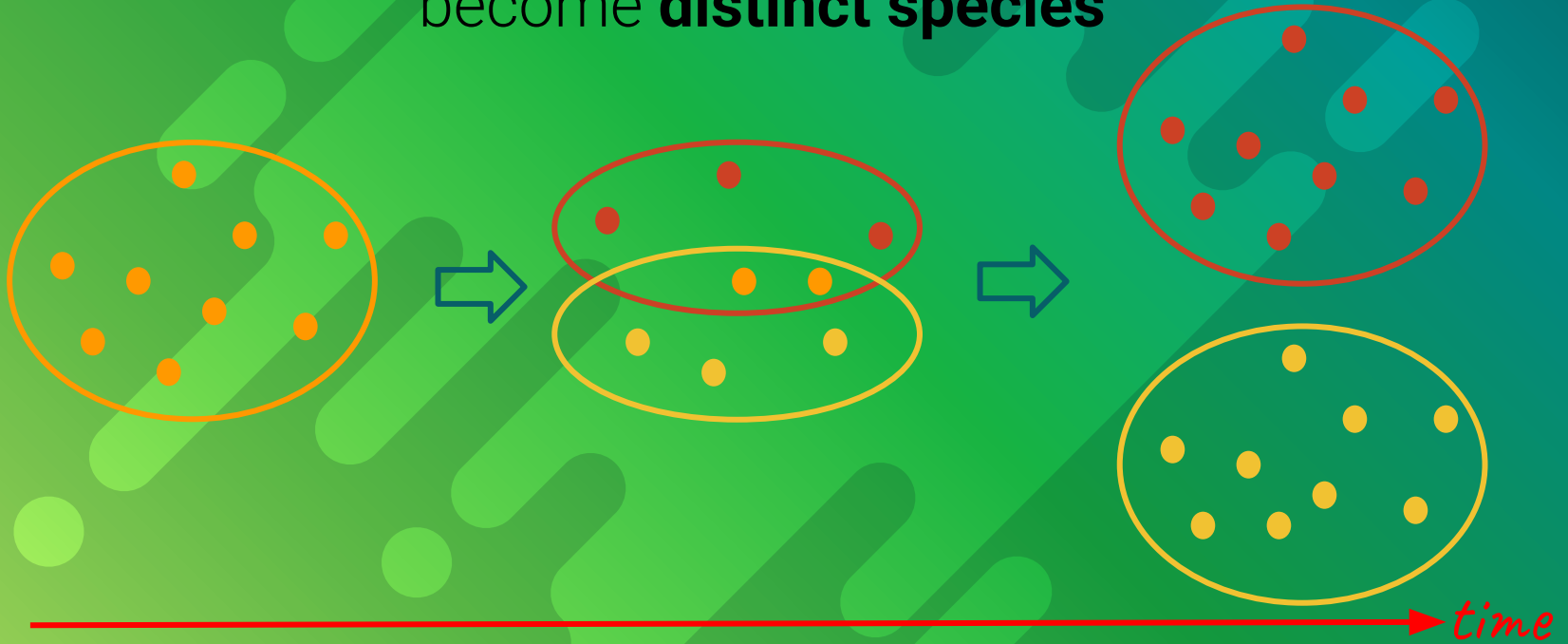


“**Genetic** and **phenotypic** differences between closely related populations of the same species”



Speciation:

“evolutionary process by which **a population** evolves to become **distinct species**”



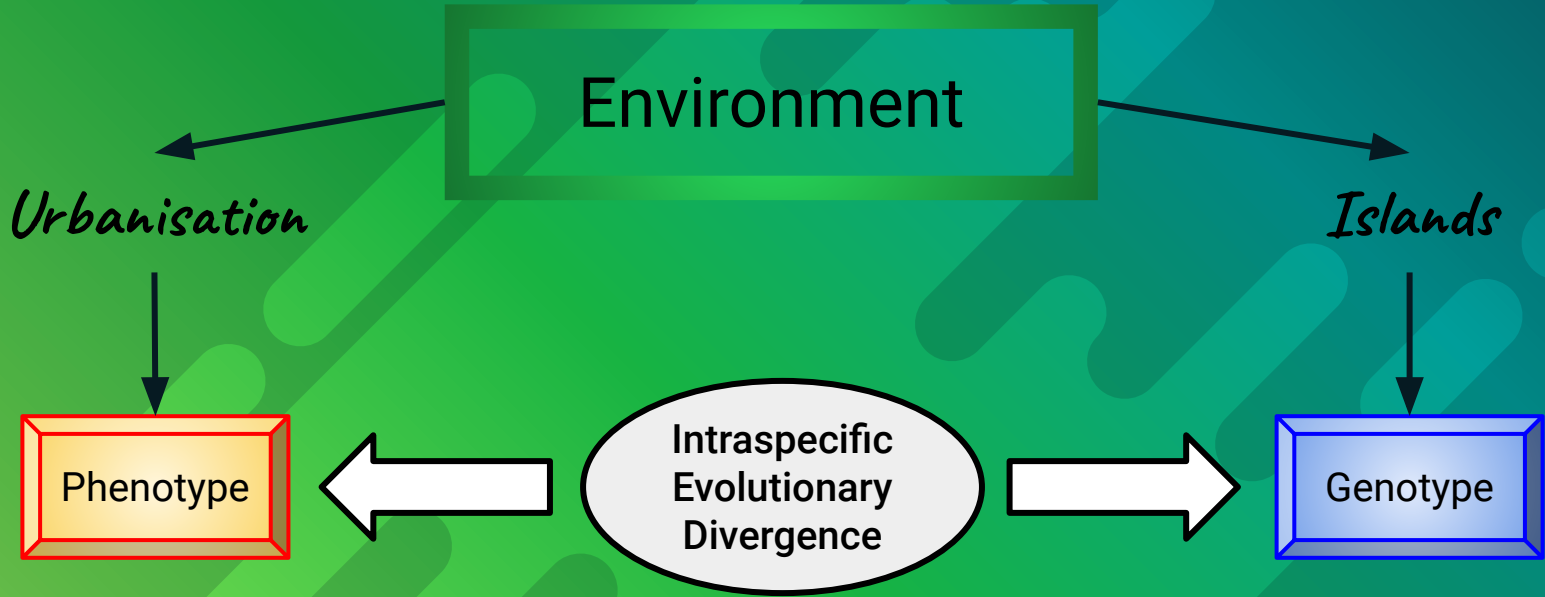


- **Fitness** and reproductive success
- **Maternal effect**

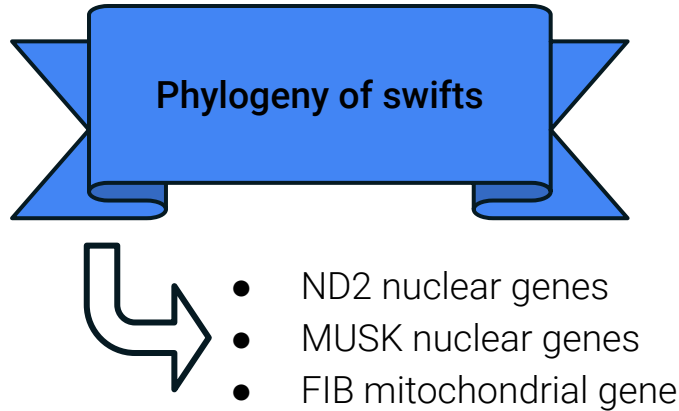
Of different **habitat** (urban vs rural)

- Genetic **relationship**
- Genetic **background**
- Gene **flow**

Of different **islands** populations



Phylogeny of *Mascarene martens*



DNA extraction

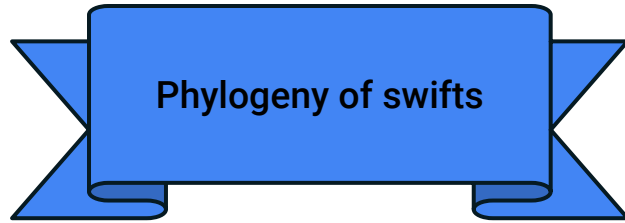


PCR Amplifications
of ND2, MUSK, and
FIB genes



Sequencing

Phylogeny of *Mascarene martens*

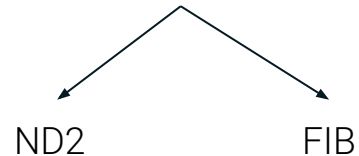


- ND2 nuclear genes
- MUSK nuclear genes
- FIB mitochondrial gene



- Compare my sequences **together**
- Compare my sequences to other sequences of **different species**

"Phylogeny of swallows (Aves: Hirundinidae) estimated from nuclear and mitochondrial DNA sequences" from Dr. Sheldon





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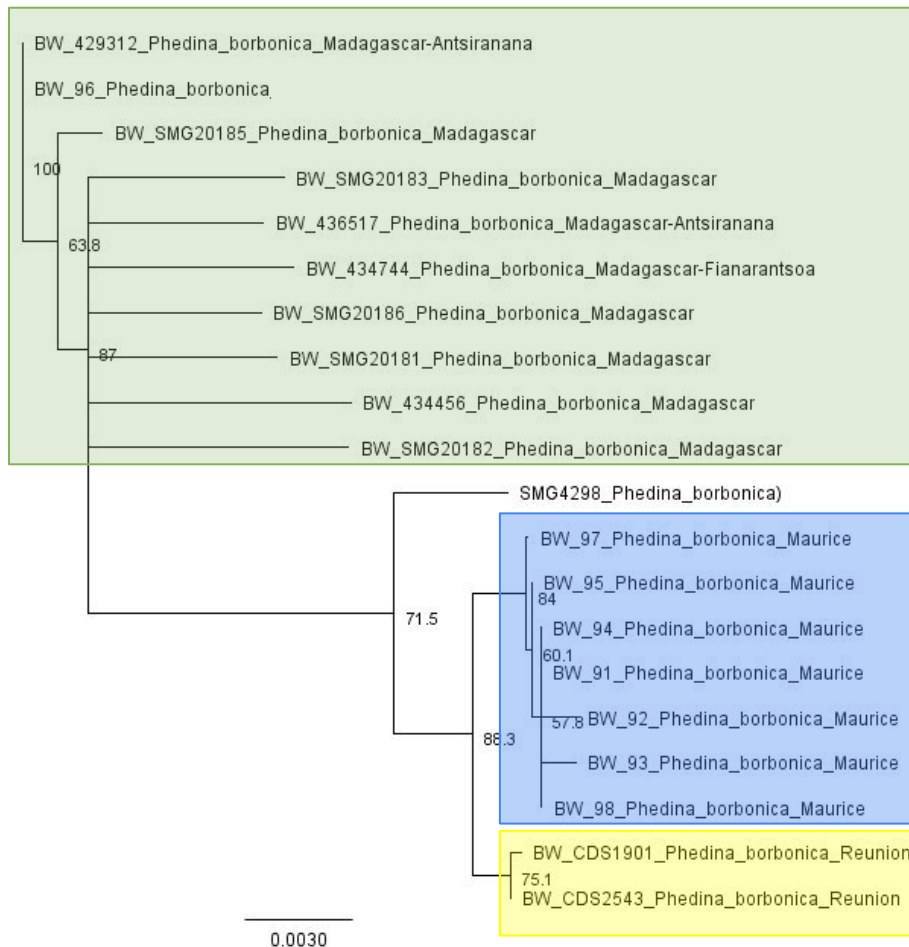


Figure 2: Neighbor-Joining consensus and concatenated (take into account both ND2 and MUSK genes) tree of *Phedina borbonica* from the Mascarene archipelago and Madagascar based on the HKY genetic distance model with 1000 iterations.

Maternal effect and habitat quality, on reproductive success of Great Tits

Fitness:

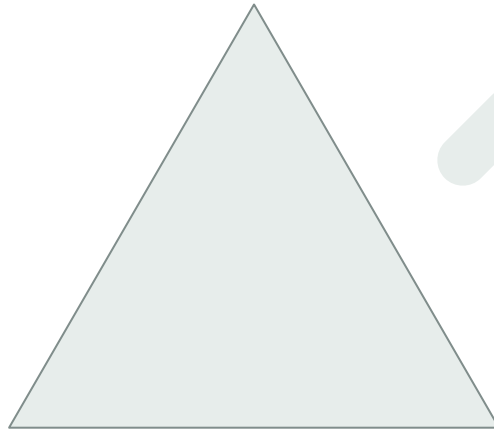
"combination of **reproductive success** and **survival**. Reflects how well an organism is adapted to its environment"

Maternal effects:

"the role of the **environment** and **genotype** of the mother in determining the phenotype of an organism"

Habitat quality =
Urban vs Rural

Reproductive success
= fitness

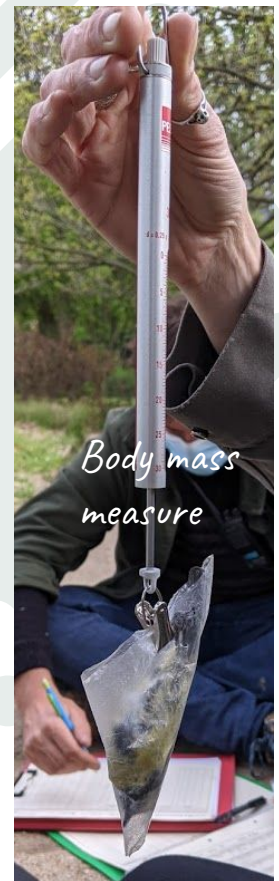


Number of
fledglings

Female **body mass** and
coloration (carotenoid
chroma content)



Maternal effect
= female health

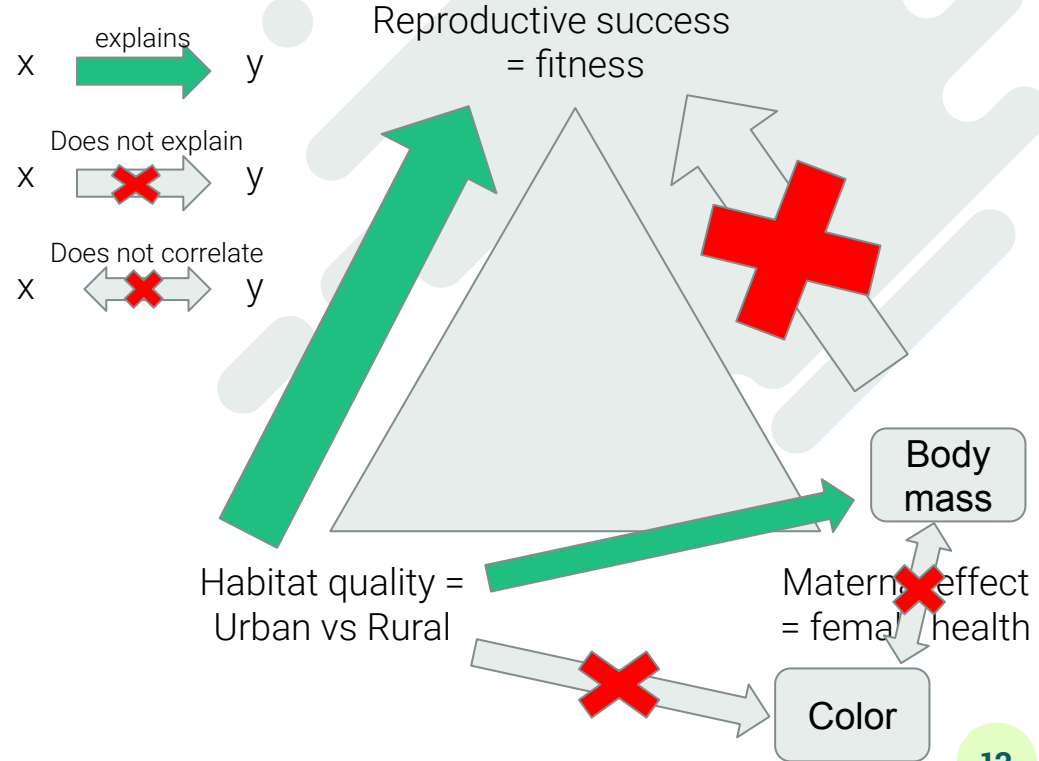


Hypothesis:

- 1) The body mass of female tits explains reproductive success in urban and rural habitats.
- 2) Habitat, carotenoid chroma, and the interaction of habitat on carotenoid chroma explain reproductive success.



Figure 5: Boxplot showing the repartition of female great tits body mass in grams between urban and rural habitat.



To conclude