

One in, one out:

Generic circumscription within the Manilkarinae subtribe (family Sapotaceae)

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The Manilkarinae subtribe

- Tropical large trees, with valuable timber, threatened by logging
- Four currently accepted genera : *Labramia*, *Faucherea*, *Labourdonnaisia*, *Manilkara*
- The first three genera are endemic to the Madagascar and surrounding islands
- Particular calyx structure : 2 whorls of 3 sepals



Aims of the study

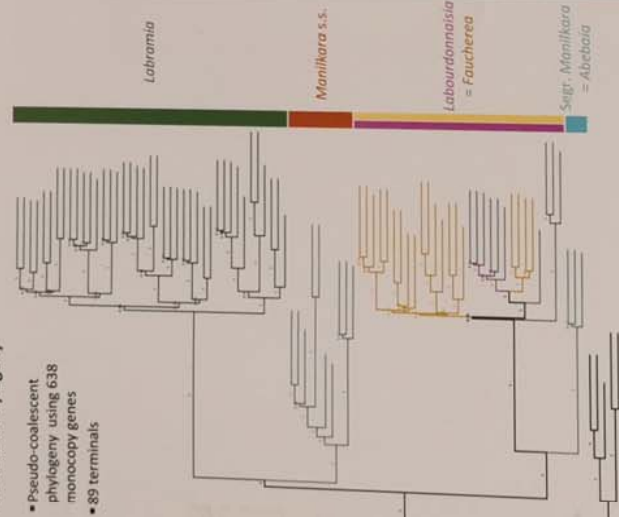
- Revise the generic circumscription using phylogenetic analysis
- Find the morphological characters that reflect the revised generic circumscription
- Understand the evolutionary history of the subtribe

Phylogenetic reconstruction

Phylogenetic reconstruction was conducted using Astral-II on 638 targeted nuclear genes.

ASTRAL-II Phylogeny

- Pseudo-coalescent phylogeny using 638 monocopy genes
- 89 terminals



The backbone of the phylogeny shows well-defined clades :

labramia is resolved as monophyletic
faucherea and *Labourdonnaisia* are intermingled in a single monophyletic clade named *labourdonnaisia*

Two *Manilkara* clades :

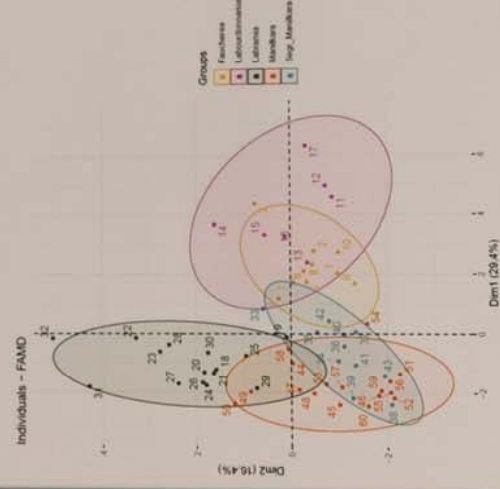
Manilkara sensu stricto
three Indo-Pacific species found nearby the *Labourdonnaisia* clade and named here *Abebaia*

Morphological analysis

Morphological scoring was mainly based on herbarium measurements, but also on information from the literature. The FAMD shows that:

- *Labramia* is distinct with few outliers
- The Malagasy *Labourdonnaisia* and *Faucherea* are intermingled but distinct from the rest
- The Mascarenes *Labourdonnaisia* (11, 12, 17) have the most extreme coordinates on Dim1
- The segregate *Manilkara* are not distinct from the *Manilkara* s.s., but show a partial overlap with *Faucherea*

FAMD with 3 qualitative and 10 quantitative variables



Additional analysis highlighted characters that discriminate the four genetic clades within the Manilkarinae:

- The dorsal appendage length
- The staminode length
- The ovary pubescence

Conclusions

The revised classification of Manilkarinae comprises 4 clades corresponding to the following genera :

- labramia** : endemic to the Western Indian Ocean islands characterized by a **glabrous ovary** and a corolla tube as long as the corolla lobes.
- manilkara s.s.** : pantropical genus which shows a **broad range of morphological variation**. However, all *Manilkara* species have long and lacinate dorsal appendages and developed staminodes.
- abebaia** : a genus name resurrected to accommodate three Indo-Pacific *Manilkara*. A **cryptic genus** living in sympatry with *manilkara* in Indo-Pacific with whom it shares the same morphology.
- bourdonnaisia** : endemic to the Western Indian Ocean islands, in which **Faucherea** is sunk. Reduction of staminodes and **loss dorsal appendages** are its discriminating characters.

Ancestral state reconstruction (ASR)

ASR was performed on flower characters.

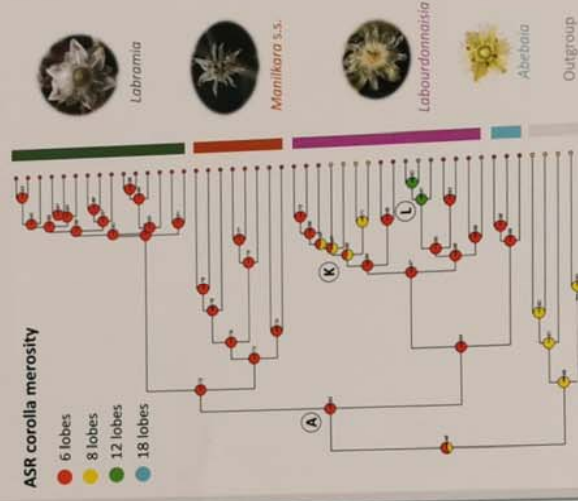
The ancestor of Manilkarinae is retrieved as having:

- a **pubescent ovary**. A switch to glabrous ovary occurred in the ancestor of *Labramia* species
- **long dorsal appendages and staminodes**. A complete loss of dorsal appendages and a reduction of staminodes are observed in *Labourdonnaisia*
- a **hexamerous corolla** (Node A). Two independent changes occurred within the *Labourdonnaisia* clade:

- an increase of the merism from 6 to 8 corolla lobes (Node K)
- a multiplication of the merism from 6 to 12 and 18 lobes for the Mascarenes *Labourdonnaisia* (Node L)

ASR corolla merosity

- 6 lobes
- 8 lobes
- 12 lobes
- 18 lobes



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