Intraspecific corolla shape variation is greater in **generalist** than **specialist** species

Evolution of converging flower morphologies in Antillean *Gesneriaceae* associated with multiple pollination syndromes

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Context

- Pollinators impose a strong selection on floral shape.
- This selective pressure is expected to vary according to the level of specialization.
- Generalists are pollinated by more functional types of pollinators than specialists. We hypothesize that this results in a relaxation of the selective pressure and thus in greater intraspecific corolla shape variation. We test here wether **if generalist species have a corolla that varies more than specialist species**, as a result from a relaxation of the selective pressure imposed by pollinators.
- Study group : *Gesneriaceae* from the West Indies.

What I used and how

- Phylogeny of Antillean *Gesneriaceae* (5 DNA markers).
- Numerisation of flowers in profile views (n=324), and focus on the hummingbird specialists and mixed-pollination syndromes (n=294) {ImageJ}.
- Geometric morphometrics analysis of flower shapes {geomorph}.
- PCA on flower morphologies.
- Stochastic mapping of ancestral syndromes {phytools}.
- Bayesian analysis to model the evolution of intraspecific floral variance under an OUM (Ornstein-Uhlenbeck) process {JIVE}. Estimation of evolutionary parameters and optimal intraspecific variance per selective regime (θ).

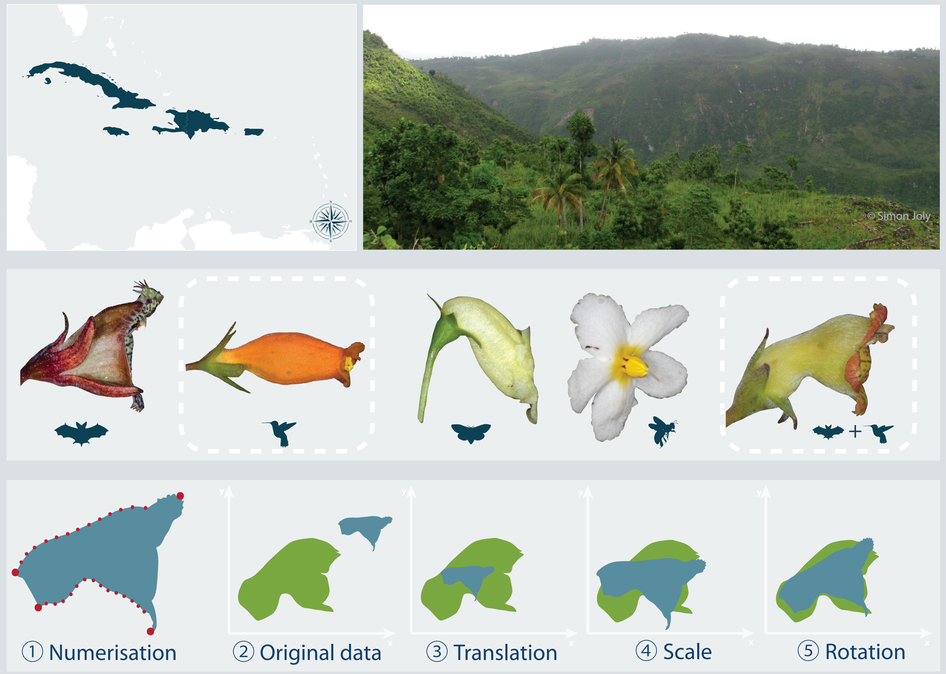
What we obtained

- Specialists and generalists have distinct shapes.
- Generalists show greater intraspecific variation in the tubular aspect of the corolla than specialists.

What's next

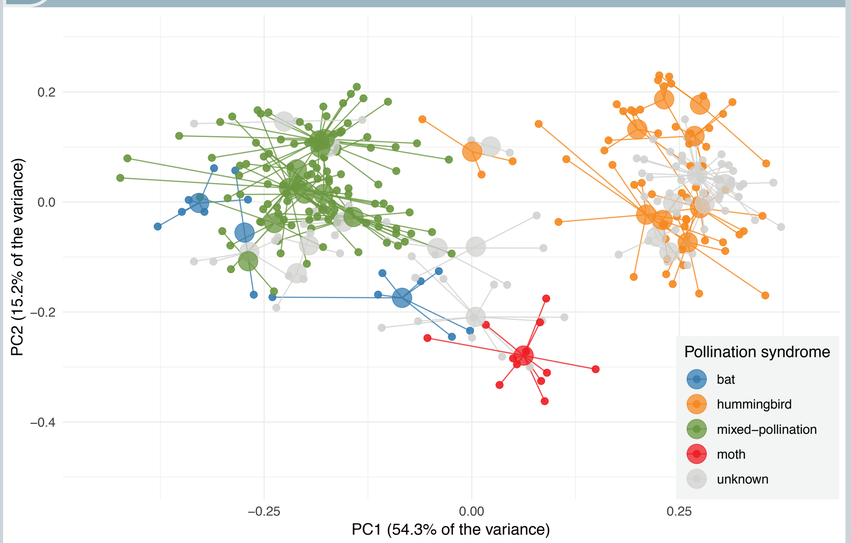
- 3D flower characterisation in the field.
- Improvement of JIVE and analysis of all syndromes.

1 Geometric morphometrics on Antillean *Gesneriaceae*



Pollination syndromes in *Gesneriaceae* from the West Indies (mainly moist forests): bat, hummingbird, moth, and bee specialits, and generalists (pollinated by hummingbirds and bats). Illustration of the geometric morphometric methodology used to get the morphological data : numerisation with landmarks and semi-landmarks followed by a Procrustes transformation for homologous comparison.

2 Corolla shape characterisation

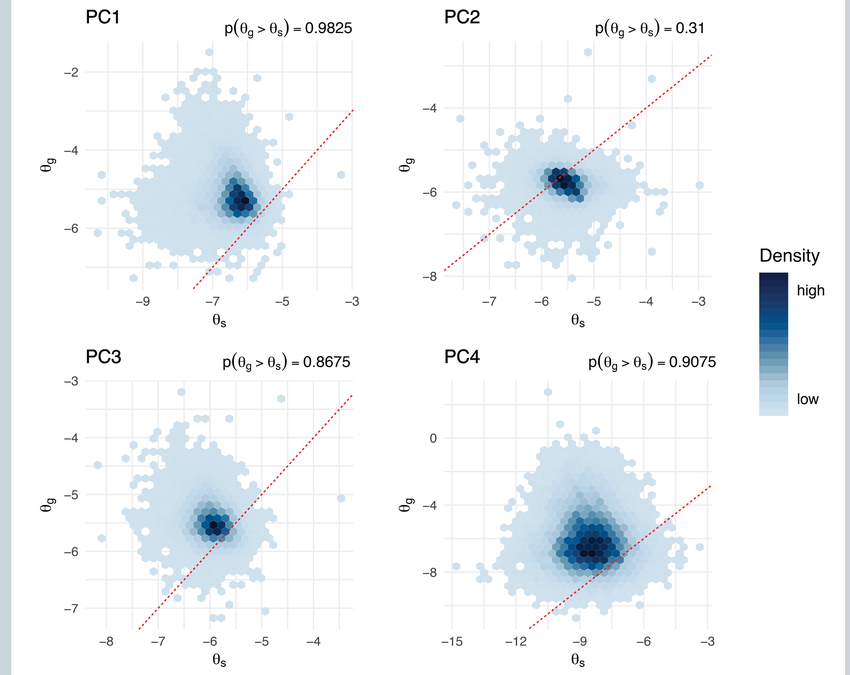


Principal components analysis of flower morphology in Antillean *Gesneriaceae* specialists and generalists, and shape variation illustrated by the 4 first axis. When the PCA is done on only hummingbird specialists and generalists, the 4 first axes used in further analyses represent 90.3% of the total variation (PC1=63.4%, PC2=14.4%, PC3=8.4%, PC4=4.1%).

3 Specific syndrome evolution and floral variation

Ancestral character reconstruction for the specialized and generalized syndrome with posterior probability at the nodes from 1000 reconstructions, and the estimated specific morphological log-variance per syndrome and PC axes , estimated using the JIVE software.

4 Estimation of joint optimal flower variation



Graphical representation of the pairs of optimal morphological log-variance values for specialists (θ_s) and generalists (θ_g) obtained under an evolutionary model OUM for PC1 to PC4 (figure A to D) showing the probability of θ_g being greater than θ_s.

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JIVE package simjoly

JOLY lab plantevolution

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