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### Special Issue

# Amazon diversification and cross-Andean dispersal of the widespread Neotropical tree species *Jacaranda copaia* (Bignoniaceae)

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## Abstract

### Aim

The phylogeographical history of Neotropical species can be difficult to reconstruct because of superimposed Neogene and Quaternary histories, and because of taxonomic uncertainty. We analysed range-wide genetic diversity in a widespread pioneer tree species, *Jacaranda copaia* (Aubl.) D. Don, to characterize phylogeographical structure, date the evolutionary relationships among lineages, and evaluate the role of dispersal and vicariance in establishing the present geographical range.

## Location

Guiana Shield; central, southern and western Amazon Basin; Chocó region; Central America.

## Methods

We analysed nine nuclear simple sequence repeat loci (nuSSR), eight chloroplast SSRs (cpSSR), and two cpDNA intergenic sequences in 341 adult trees. Genetic differentiation at nuSSRs was inferred using Bayesian clustering. Dating of chloroplast lineage divergence was obtained using a range of published mutation rates and Bayesian coalescence analyses. Population divergence dating was performed using an isolation-with-migration model for eight loci (one cp sequence and seven nuSSRs).

## Results

Nuclear SSR variation identified three geographically overlapping clusters (*nu-1*, *nu-2*, *nu-3*). Twelve cpDNA haplotypes were clustered into two haplogroups (*cp-1*, *cp-2*) with the central Amazon harbouring the highest diversity. Molecular dating analysis suggests that cpDNA haplotype diversification started around the end of the Pliocene (2.61 Ma on average), whereas population divergence was more recent and occurred during the mid-Quaternary (point estimates between 357 and 436 ka).

## Main conclusions

The genetic variation of *J. copaia* in the Neotropics was shaped mainly by Pleistocene events. Chloroplast diversity did not display the expected *cis/trans* Andean disjunction, indicating recent dispersal. Nuclear variation revealed that separate regions share a recent history, with a centre of diversity in the central Amazon Basin. The geographical pattern of diversity is congruent with the distribution of the two subspecies, *J. copaia copaia* and *J. copaia spectabilis*, and evidence of nuSSR admixture between the two taxa supports their classification as subspecies.

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