
Great genetic diversity but high selfing rates and short-distance gene flow characterize populations of a tree (*Foetidia*; Lecythidaceae) in the fragmented tropical dry forest of the Mascarene islands

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Abstract

Following the global trend of deforestation and degradation, tropical dry forests in the Mascarenes archipelago on Reunion has undergone harsh reduction and fragmentation within 3 centuries of human occupation. We investigated the genetic diversity, mating system, and gene flow in fragmented populations of the native tree *Foetidia mauritiana* (Lecythidaceae) on Reunion, using microsatellite genotyping of adults (in- and ex situ) and seed progenies (in situ only). To test genetic isolation between the Mascarene islands, we also genotyped conspecific adults on Mauritius, and trees of *Foetidia rodriguesiana* on Rodrigues. We found a high genetic diversity among the trees on Reunion, but no population structure ($G'ST$: 0.039–0.090), and an increase of the fixation index (FIS) from adults to progenies. A subsequent analysis of mating systems from progeny arrays revealed selfing rates $> 50\%$ in fragmented populations and close to 100% in lone trees. A paternity analysis revealed pollen flow ranging from 15.6 to 296.1 m within fragments. At broader scale, the populations of *F. mauritiana* on Reunion and Mauritius are genetically differentiated. The morphologically allied taxa *F. rodriguesiana* and *F. mauritiana* are clearly isolated. Therefore, this case study shows that genetic diversity may persist after deforestation, especially in long-lived tree species, but the reproductive features may be deeply altered during this process. This would explain the low seed production and the absence of recruitment in *F. mauritiana*. Restoration programs should take into account these features, as well as the importance that trees ex situ represent in restoring and conserving diversity.

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