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Genetic structure and diversity of *Coscinium fenestratum*: a critically endangered liana of Western Ghats, India

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Abstract

Coscinium fenestratum is a critically endangered medicinal plant, well-known for its bioactive isoquinoline alkaloid berberine. The species has been over harvested from its natural habitats to meet the huge requirement of raw drug market and industrial consumption. This has lead to a rapid decline in the population size and has also led to local population extinction at few locations in the Western Ghats, India. In this study, inter-simple sequence repeat markers were used to investigate the genetic variation and population structure of seven extant populations of *C. fenestratum* from the central Western Ghats, India. Eight primer combination produced a total of 57 unambiguous bands, of which (47.1 %) were polymorphic. The species exhibited a moderate to low level

of intra population genetic diversity (H_s = 0.347 ± 0.008; H_t = 0.378 ± 0.006 (POPGENE) and H_s = 0.262 ± 0.0028; H_t = 0.204 ± 0.020 (HICKORY)). The populations were low to moderately differentiated from one another (G_{ST} = 0.221) and geographical distance was not significantly correlated with genetic distance, suggesting that these long-lived, geographically distant remnant populations were once connected through gene flow. There was a significant amount of genetic variation among populations (19.85 %). The Bayesian software STRUCTURE and HICKORY were used to further reveal the genetic structure of *C. fenestratum*. The results revealed weak population structure (K = 2) with one single widespread gene pool, and indicated that gene flow and inbreeding are likely to be the major driving force in shaping current population genetic structure of *C. fenestratum*. Thus, an understanding of the genetic diversity and population structure of *C. fenestratum* can provide insight into the conservation and management of this species.

Keywords

C. fenestratum Western Ghats ISSR Critically endangered Genetic diversity Genetic differentiation

Electronic supplementary material

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Notes

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Supplementary material

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Supplementary material (PDF 132 kb)

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