



## Development of novel chloroplast microsatellite markers for *Ginkgo biloba*

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**ABSTRACT.** *Ginkgo biloba* is considered to be a living fossil that can be used to understand the ancient evolutionary history of gymnosperms, but little attention has been given to the study of its population genetics, molecular phylogeography, and genetic resources assessment. Chloroplast simple sequence repeat (cpSSR) markers are powerful tools for genetic studies of plants. In this study, a total of 30 perfect cpSSRs of *Ginkgo* were identified and characterized, including di-, tri-, tetra-, penta-, and hexanucleotide repeats. Fifteen of 21 designed primer pairs were successfully amplified to yield specific polymerase chain reaction products from 16 *Ginkgo* cultivars. Polymorphic cpSSRs were further applied to determine the genetic variation of 116 individuals in 5 populations of *G. biloba*. The results showed that 24 and 76% genetic variation existed within and among populations of this species, respectively. These polymorphic and monomorphic cpSSR markers can be used to trace the origin and evolutionary history of *Ginkgo*.

**Key words:** Chloroplast genome; Genetic diversity; *Ginkgo biloba*; Microsatellites