

Taxonomic identity of *Styrax duclouxii* Perkins & Janet Russell (Styracaceae), based on chloroplast genome and morphological comparison

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Abstract

In this study, a combination of chloroplast genome analysis and morphological comparison was utilized to provide evidence for reinstating the species designation of *S. duclouxii*, which had previously been considered synonymous with *S. japonicus* or *S. grandiflorus* within the genus *Styrax*. The results of chloroplast genome comparison revealed a contraction in the IR region of *S. duclouxii*. The coding region exhibited a higher level of conservatism compared to the non-coding region, while the single copy (SC) region displayed greater variability than the reverse repeat (IR) region. DNA polymorphism analysis indicated that multiple fragments showed relatively high Pi values and could potentially serve as DNA barcodes. Additionally, phylogenetic reconstructions demonstrated that *S. duclouxii* formed a single branch. The morphological comparison of the three species was conducted using voucher specimens and field observation, revealing distinct differences in leaf shape, apex, margin, vein type, and base among the three species. Moreover, the color and pubescence of the pedicle play a crucial role in morphologically distinguishing *S. duclouxii*, *S. grandiflorus* and *S. japonicus*. The aforementioned evidence lends support to the reinstatement of the species name *S. duclouxii*. Furthermore, the approach of comparing chloroplast genome and morphology in this study offers a novel perspective for species identification and taxonomy.

Keywords: *Styrax*, reinstatement, morphological contrast, chloroplast genome, phylogenomics