RESEARCH ARTICLES

Inference of phylogenetic relationships among key angiosperm lineages using a compatibility method on a molecular data set

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摘要 Phylogenetic relationships among the five key angiosperm lineages, *Ceratophyllum*, Chloranthaceae, eudicots, magnoliids, and monocots, have resisted resolution despite several large-scale analyses sampling taxa and characters extensively and using various analytical methods. Meanwhile, compatibility methods, which were explored together with parsimony and likelihood methods during the early development stage of phylogenetics, have been greatly under-appreciated and not been used to analyze the massive amount of sequence data to reconstruct the basal angiosperm phylogeny. In this study, we used a compatibility method on a data set of eight genes (mitochondrial *atp1*, *matR*, and *nad5*, plastid *atpB*, *matK*, *rbcL*, and *rpoC2*, and nuclear 18S rDNA) gathered in an earlier study. We selected two sets of characters that are compatible with more of the other characters than a random character would be with at probabilities of $p^{M<0.1}$ and $p^{M<0.5}$ respectively. The resulting data matrices were subjected to parsimony and likelihood bootstrap analyses. Our unrooted parsimony analyses showed that *Ceratophyllum* was immediately related to eudicots, this larger lineage was immediately related to magnoliids, and monocots were closely related to Chloranthaceae. All these relationships received 76%–96% bootstrap support. A likelihood analysis of the 8 gene $p^{M<0.5}$ compatible site matrix recovered the same topology but with low support. Likelihood analyses of other compatible site matrices produced different topologies that were all weakly supported. The topology reconstructed in the parsimony analyses agrees with the one recovered in the previous study using both parsimony and likelihood methods when no character was eliminated. Parts of this topology have also been recovered in several earlier studies. Hence, this topology plausibly reflects the true relationships among the five key angiosperm lineages.

关键词

angiosperm Ceratophyllum character analysis Chloranthaceae compatibility eudicots magnoliids monocots phylogenetic method phylogeny

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