

Phylogenetic Dating with Confidence Intervals Using Mean Path-lengths

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Abstract

The mean path-length (MPL) method is simple method for dating nodes in a phylogenetic tree. Age-estimates and corresponding confidence intervals can be calculated quickly with a computer program even in very large trees. Necessary input data is a rooted phylogenetic tree with edge-lengths (internode-lengths) approximately corresponding to the number of substitutions between the nodes. Given this, the MPL method produces relative age estimates with confidence intervals for all nodes in the tree. With the age of one or several nodes of the tree being known from reference fossils, the relative age estimates induce absolute age estimates and confidence intervals for the nodes in the tree. The MPL-method relies on the assumption that substitutions occur randomly and independently between different sites in the DNA sequence, and that the substitution rates are approximately constant in time, i.e. assuming a molecular clock. The method is illustrated with Liliales, a group of monocot flowering plants.