

《International Symposium》

Let's Talk about Trees

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Abstract

[Cladistics]

Tree and network in systematics, stemmatics, and linguistics: Structural model selection in phylogeny reconstruction

MINAKA Nobuhiro

National Institute for Agro-Environmental Sciences and University of Tokyo

Phylogenetic reconstruction in general aims at estimating the most plausible tree or network based on character data of evolving objects. In evolutionary biology, textual stemmatics, and historical linguistics researchers have independently and repetitively developed a set of rules for building phylogenetic trees from data on organisms, manuscripts, and languages, respectively. All these sciences have in common the basic features of historical sciences ("palaetiological sciences" by William Whewell / "historiographic sciences" by Avezier Tucker). Estimating evolutionary history searches for the best solution among possible alternative phylogenetic hypotheses. However, the best solution isn't necessarily true in a historical sense because we can't observe directly or experimentally the past evolutionary processes and its consequent patterns. All we can do is to find the best estimate as accurately as we can by comparing all possible trees or networks on the basis of an optimality criterion such as parsimony, likelihood, or Bayesian posterior probability. Historical reasoning ("tree-thinking") is comparable in nature; it has been recognized as "abductive" reasoning sensu Charles S. Peirce. Abduction is a form of non-deductive inference to the best hypothesis for a given data. An iconographical survey of historical development from ancient times to the present of phylogenetic diagrams reveals a wider array of various graphical tools (chain, tree, and network) for visualizing object-diversity and its spatiotemporal modification. These graphical tools could be used for selecting efficient structural models for estimating phylogenies and constructing classifications of evolving objects. evolutionary biology, textual stemmatics, and historical linguistics share not only basic characteristics of historical sciences but also those of data visualization and information graphics.