

# Revising Radiolarian systematics: Combining traditional and integrative taxonomy with molecular phylogenetic analysis

Noritoshi Suzuki

Department of Earth Science, Graduate School of Science, Tohoku University, 6-3 Aoba  
Arakamki, Aoba-ku, Sendai City, 980-8578 JAPAN

[suzuki.noritoshi@nifty.com](mailto:suzuki.noritoshi@nifty.com)

There are two key problems in developing a modern morphological classification of radiolarians. The first lies with the so-called “initial spicular system” of the siliceous test, there has been a consensus that this is a key character at genus or family levels. The evolution of this initial spicular system, however, has not been verified so far. The second, and more serious problem for radiolarian taxonomy has been the difficulty of developing rigorous type-specimen based species concepts and definitions for the numerous taxa described and (usually) illustrated in the late 19th Century. The latter issue was greatly improved by the Joint Haeckel and Ehrenberg Project ([www.kahaku.go.jp/research/db/botany/ehrenberg/contents.html](http://www.kahaku.go.jp/research/db/botany/ehrenberg/contents.html)). The former has been addressed by molecular phylogenetic studies under very careful and strict morphological identification by collaborating French and Japanese teams (lead by Fabrice Not in France and N. Suzuki in Japan). This provided a solution for the timing of origination of the Order Nassellaria in the Late Devonian. It indicated commonality of the “initial spicular system” at the family and genus levels, but not at higher taxonomic levels, i.e. above family level. A new taxonomic scheme congruent with the reliable parts of the molecular trees and based on strict application of the ICZN, has now been constructed (in press in *Geodiversitas*). This system is now also being used as the basis for a software program for easier practical identification in future.