

1-9: *TEREBRATULINA*: IS 81 SPECIES TOO MANY?

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Evolutionary biologists and paleontologists view species recognition and species delimitation quite differently, yet certain obvious parallels exist. Can we actually study the process of speciation in the fossil record? If so, how? Temporal patterns of morphological variation revealed among fossils are assumed to be an adequate proxy for processes of evolutionary change among populations and species of organisms. But are they? We decided to test this assumption with *Terebratulina*, a well-known, long-lived genus of terebratulid (short-looped) brachiopod. Utilizing online databases of named species, we discovered 81+ named species: 32 extant (more species than any other living brachiopod genus) and 49+ extinct. Restricting our analysis to the Pacific Ocean, western Pacific species outnumber eastern Pacific species by roughly 3:1. Does this number actually reflect remarkably high diversity, heavily skewed biogeographically, consistent with well-known southwest Pacific biodiversity hotspots? Or is it biased in ways that have little to do with evolution and biodiversity? Molecular sequence data have been obtained for only three Pacific *Terebratulina* species and cannot help to answer this question. First, we investigated morphological differences among samples of named species from the Jurassic to the Holocene in the western and eastern Pacific, and conducted Bayesian phylogenetic analyses to discover patterns of relationship, in each region separately and combined. Taxonomic oversplitting appears to have generated quite a few named species, exaggerating the biogeographic pattern. Second, we conducted tip-dating analyses to investigate the relative prevalence of anagenesis, budding cladogenesis, and divergent cladogenesis in the history of the *Terebratulina* lineage. Just as decades-old estimates by Valentine and Raup of Phanerozoic species diversity generated debate about the ability of the fossil record to reveal long-term, global patterns that are biological, and not merely geologically biased, studies today of long-term paleobiodiversity at the species level must delve deeply into the history and practice, paleontological and sociological, of the naming of species, extant and extinct, to better understand their biological and macroevolutionary significance.

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