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"Evolution of Microsnails (Ellobioidea; Carychiidae) - Phylogeny and Cryptic Diversification"

In an integrative approach, taxonomic and phylogenetic hypotheses were combined to analyze temporal and geographic diversification of epigean (Carychium) and subterranean (Zospeum) evolutionary lineages in Carychiidae microgastropods (Eupulmonata, Ellobioidea). Initial morphospecies assignments were investigated by different molecular delimitation approaches. Despite a conservative delimitation strategy, carychiid morphospecies comprise a great number of unrecognized evolutionary lineages. This phenomenon can be attributed to historic underestimation of morphological stasis and phenotypic variability amongst lineages. Hence, carychiid taxonomy is in dire need of revision. An inferred wide distribution and variable phenotype suggest underestimated diversity in Zospeum. Several Carychium morphospecies are results of past taxonomic lumping. By collecting populations at their type locality, molecular investigations are able to link historic morphospecies assignments to their respective evolutionary lineage.

The evolution of Carychiidae is characterized by relatively few (long distance) colonization events. Rare founder populations may have initially colonized a continent or cave system. Subsequent passive dispersal into adjacent areas led to in situ pan-continental or mountain range diversifications. Major environmental changes did not influence carychiid diversification. The role of microhabitats must be highlighted.