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Sexually dimorphic ornamentation in modern spinicaudatans and the taxonomic implications for fossil clam shrimps

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The phylogenetic studies of clam shrimps (Branchiopoda, Crustacea) demonstrated that the significance of several morphological characters for classification of branchiopod shells should be critically re-evaluated. Such a venture is particularly important for integrating the taxonomy of fossil and extant branchiopods. One of the shell characters widely used in the branchiopod classification is the carapace ornamentation pattern. This character might, however, be significantly influenced by intraspecific variability and in particular the sexual dimorphism. In this study we investigate the pattern of ornamentation in extant branchiopods—including differences resulting from sexual dimorphism—in order to assess its value for branchiopod taxonomy. We examined 184 individuals representing 10 living species belonging to 7 genera, 5 families, and 2 suborders from China, and compared with the results of previous studies. Although some differences in ornamentation were related to reproductive modes, the basic ornamentation patterns or combinations were stable within each extant species. We found out that some taxa indeed display sexually dimorphic ornamentations, but their basic ornamentation patterns or combinations are stable within each species so they do not significantly influence the taxonomic identification. Integration of data on fossil and extant taxa indicates that similar ornamentation patterns can be observed on familial level of fossil spinicaudatan branchiopods and indicates therefore that characteristic ornamentation patterns can help to identify these taxa in the fossil record. In light of the new molecular phylogeny, we re-evaluated the phylogenetic relationship between fossil and extant spinicaudatan taxa. The resulting tree suggests: (i) paraphyly of the traditional Eosestherioidea, (ii) an affinity between *Ozestheria* and *Triglypta*, and (iii) an affinity between *Cyzicus* and *Diestheria* or *Aquilonoglypta.*

Key words: Branchiopoda, Spinicaudata, ornamentation, sexual dimorphism, systematics, taxonomy.

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