ACTA PALAEONTOLOGICA POLONICA

Oligophyly and evolutionary parallelism: A case study of Silurian graptolites

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Acta Palaeontologica Polonica 43 (4), 1998: 549-572

Oligophyly may be defined as a restrictive factor in evolution leading to minimization of the number of phyletic lines owing to an occasional reduction by means of mass extinction as well as to their recovery from scanty survivors. The monophyletic origin of the vast majority of taxa finds its explanation in this succession of events, namely in the diversity reduction (DR) - rediversification (RD) sequence. In turn, the recovery from a few or a single ancestral species (near-monophyly or monophyly) causes a number of consequences for the evolution of emerging new taxa. They produce a particular class of systematic groups called genealogical domains. Such groups display an exceptionally close affinity and a similar evolutionary potential exhibited i.e. an abundant parallelism. In other words, the paucity of ancestry (oligophyly) explains why both the monophyletic origin and evolutionary parallelism are such common features of the phylogeny in most fossil groups. Parallelism is caused by the similarity of apomorphic tendencies (known as `underlying synapomorphy' in phylogenetic systematics), which are among the most characteristic features of evolution within a genealogical domain. It is now evidenced that the vast majority of Late Silurian monograptid faunas are descendants of only two species - survivors from the severe lundgreni Event. Numerous cases of heterochronic parallelism and evolutionary repetitions observed within the repertoire of the Late Silurian monograptid faunas may be explained as a far reaching effect of oligophyly. Each ancestral species established its own genealogical domain displaying certain apomorphic tendencies. The same is true for the monophyletic origin and early radiation of Llandovery monograptids. Whilst graptolites provide numerous graphic examples substantiating the oligophyly concept, it is clear that the phenomena discussed are of a much more general nature.

Key words: Monophyly, oligophyly, mass extinctions, adaptive radiations, recoveries, genealogical domains, evolutionary parallelism, graptolites, Silurian.

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Full text (3,931.7 kB)