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TRIASSIC SCLERACTINIA: HETEROGENOUS ORGANISMS WITH PALEOZOIC ROOTS

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Skeletonized anthozoans show an amazing morphological and microstructural diversity from the very beginning of their Triassic emergence i.e., about 14 MA after the Permian/Triassic crisis. Many of them developed solitary and phaceloid growth forms but a number of them developed colonies with highly integrated corallites as well. Four major microstructural groups are distinguished among Triassic corals that traditionally correspond to the higher-rank taxa: Pachythecaliina, Stylophyllina, Caryophylliina, and informal group of „thick-trabecular" corals. Several skeletal morphological characters of pachythecaliinans make them similar to some paleozoic polycoeliids with simple, non-dissepimentate, and thick-walled coralla, although different mineralogy and late-ontogenetic features of the skeleton in both groups preclude a simple ancestor-descendant evolutionary scenario. Skeletal ontogeny of the other three major groups of the Triassic corals is significantly different from rugosan, hence clearly suggesting their distinct evolutionary histories and in this presentation we will focus on the problem of their origin. Morphological and microstructural distinction between stylophylliinan (= septal spines), caryophylliinan (= „Uhr-septum") and „thick-trabecular" (= widely separated „calcification centers") corals is well established already in the Anisian, however, several other formally or informally designated taxonomic groups within each traditional suborder also developed elaborated and thus probably functionally specialized skeletal structures. Among traditional caryophylliinans (that in majority do not show particular morphological specialization) protoheterastraeids develop tabular endotheca, monoclinal septa, and form colonies via multiple septal division. Among „thick-trabecular" corals, many develop conspicuous structures on septal flanks like menianae and pennulae (e.g., *Craspedophyllia*). Though a vast majority of Triassic corals have epithecate and cup-like calices, some groups of „thick-trabecular" corals have completely everted calices (e.g., *Araiophyllum*). All these diverse and often well canalized structural specializations suggest that their attainment occurred in a longer evolutionary process. There are various lines of evidences showing that the „scleractinian" style of skeletal ontogeny, architecture and mineralogy extends deeply into the Paleozoic and is not limited to the Mesozoic. Aragonitic scleractiniomorphs have been reported in the Permian (*Numidiaphyllum* Flügel, 1976; *Houchangocyathus* Ezaki, 2000) and also in the Ordovician (two species of *Kilbuchiphyllia* Scrutton & Clarkson 1991, and disregarded in the literature *Sumsarophyllum* Lavrusevich, 1971 and *Tjanshanophyllia* Erina & Kim, 1981). Also results of recent molecular studies suggest that at least two major clades of Recent Scleractinia diverged from a common stock in the Paleozoic (Carboniferous). Remarkably, Paleozoic scleractiomorphs do not co-occur with typical rugosans in the same strata, thus possibly were overshadowed by rugosans and tabulates in most environments but due to different trophic specialization they could manage in diverse but less competitive niches. Discovery of Paleozoic scleractiniomorphs challenged the view that their skeletonization occured only in the mid-Triassic (some authors suggest multiple skeletonization events among scleractiniomorphs in the Palaeozoic and Mesozoic). It became clear that „scleractiniomorhs" have a long evolutionary history and hence a „*deus ex machina*" scenario in which major groups of the Triassic corals evolved exclusively during the Triassic adaptive radiation (monophyletic scenario) is no longer needed. Scleractiniomorph survivors of the end-Permian crisis transferred to the Triassic much of their Paleozoic heritage i.e., patterns of the ruling architectural styles and diversity of skeletal microstructures.