

S4 - REVISION OF THE CARNIAN/NORIAN CONODONTS THROUGH THE APPLICATION OF CLADISTIC ANALYSIS

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The taxonomy of Upper Carnian/Lower Norian conodont platform elements is problematic due to the large number of forms occurring in this relatively short stratigraphic interval and the high intraspecific variability affecting many species. The abundance of synonyms per species and the absence of an established phylogenetic model contributes to increase this systematic confusion. In an attempt to solve the taxonomic and phylogenetic problems of the Upper Triassic P1 conodont elements, we applied numerical cladistic analysis to the species belonging to the five most widespread genera (*Paragondolella*, *Carnepigondolella*, *Metapolygnathus*, *Epigondolella* and *Norigondolella*) from the Pizzo Mondello section (Sicani Mountains, Western Sicily, Italy), GSSP candidate for the Norian. These analyses confirmed the validity of a series of evolutionary trends among the platform elements, evidenced the most important morphological characters for their classification and allowed us to make order in the systematic position of the analyzed taxa. The analysis indicated that *Metapolygnathus*, *Epigondolella* and *Norigondolella* are monophyletic groups and, thus, true phylogenetic genera. *Paragondolella* and *Carnepigondolella* by contrast are paraphyletic grades including basal members of, respectively, the whole clade and a less inclusive group containing *Metapolygnathus* and *Epigondolella*, and thus early evolutionary stages of the other three taxa and not true phylogenetic genera. These results show the potential of applying cladistic methods also to parataxonomic taxa. Parsimonious grouping by synapomorphies (shared derived character states) provides in fact always a more informative and natural classification than using simple similarities (phenetics).

W6 - POSSIBLE INFLUENCE OF THE $\delta^{13}\text{C}$ VARIATIONS ON THE CARNIAN/NORIAN CONODONTS DIFFUSION

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Quantitative analyses of the absolute abundances of the species belonging to the five most widespread Upper Carnian/Lower Norian conodont genera (*Paragondolella*, *Carnepigondolella*, *Metapolygnathus*, *Epigondolella*, and *Norigondolella*) from the Pizzo Mondello section (Monti Sicani, Western Sicily, Italy), GSSP candidate for the Norian stage (Balini et al., 2008), show potential ecological competition between these genera. Cross checks of the quantitative curves evidence the presence of three major assemblage changes, named T events: at T1 *Carnepigondolella* is replaced by its descendant *Epigondolella* in an evolutionary step; at T2 *Epigondolella* is substituted by the mass occurrence of *Metapolygnathus* and at T3 *Metapolygnathus* is succeeded by advanced *Epigondolella* and by *Norigondolella*. A comparison between these quantitative curves and coeval $\delta^{18}\text{O}$ and $\delta^{13}\text{C}$ isotopic curves, obtained from the carbonate bulk of the section, shows a correspondence between higher $^{13}\text{C}/^{12}\text{C}$ ratios and event T2 (and partially event T3), but not with T1. Thus, while the shifts in the C isotopic composition of seawater do not affect conodont evolution, they have an influence on the diffusion of the studied genera, which react differently to the $\delta^{13}\text{C}$ variations. *Epigondolella* and *Carnepigondolella* proliferate in fact when seawater $\delta^{13}\text{C}$ is lower than 2.5‰, *Metapolygnathus* is instead limited to environmental conditions related to $\delta^{13}\text{C}$ values higher than 2.5‰ (Mazza et al., 2009). The rapid expansion of photosynthetically active organisms in the Upper Carnian may explain these perturbations in the carbon cycle and have influenced the trophic chain of the different conodont animal genera, thus producing mutual local migrations.