

The phytoPal Project

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ABSTRACT

The Proterozoic and Palaeozoic phytoplankton fossil record is composed principally of the cysts of acritarchs, the phycomata of prasinophyte algae and very rare zygotes of zygнемatalean algae. From the perspective of the fossil record it appears as if these groups of phytoplankton formed the basis of the marine food web.

We intend to document, via a relational database, the global and stratigraphical distribution of Palaeozoic phytoplankton. This database will be achieved through the collaboration of an international team of phytoplankton workers.

One of our principle aims is to document the diversity of Palaeozoic phytoplankton through the construction of a Sepkoski-type curve. The distribution of the phytoplankton can then be related to changing patterns in global climate, macrofaunal diversity and the end Ordovician, Late Devonian and Permian–Triassic extinction events.

FUNDING

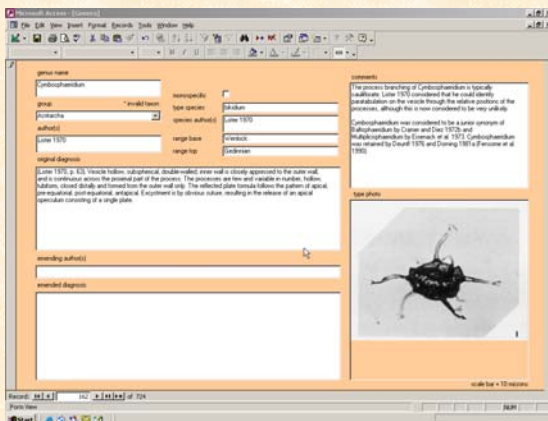
In 2003 the Leverhulme Trust awarded a Research Interchange Grant to Dick Aldridge (University of Leicester). The objective of this grant is to foster closer links between scientists interested in Palaeozoic palynology and principally the study of the acritarchs and prasinophyte algae. The name phytoPal was, therefore, coined. The free exchange of ideas lies at the heart of phytoPal. This exchange takes place via regular workshop meetings, through discussion on an email distribution list and through exchange visits.

MEETINGS

The first workshop of the phytoPal Project was held at the University of Leicester on the 11-12th December 2003 to coincide with the 47th Palaeontological Association meeting. Future workshops will be held in conjunction with relevant palaeontological meetings.

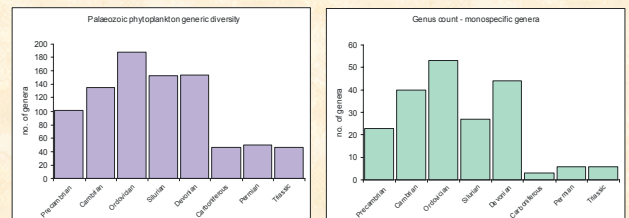
DATABASE

A relational database is being constructed using Microsoft Access. At present the records of 724 phytoplankton genera have been entered. These records include author, stratigraphical and taxonomic information (e.g. accepted and rejected synonymies, homonyms and diagnoses). The records of approximately 1500 species have so far been entered into the database and it is anticipated that a further 5000–6000 species will be entered upon completion.



PHYTOPLANKTON DIVERSITY

Initial analysis of the database confirms the previously recognized patterns of Palaeozoic phytoplankton diversity. The highest diversity occurs in the Ordovician, with a distinct decline in the Carboniferous, before the arrival of the 'modern' phytoplankton assemblages in the Triassic and Jurassic. Thus, we are examining a part of one of the most important biotic turnovers in the fossil record.



The diversity of the 282 described monospecific acritarch, prasinophyte and zygнемatalean genera has also been examined. The Silurian contains fewer monospecific genera than might be anticipated when compared with the general trend in phytoplankton diversity. Our database will help us to identify the reasons behind such 'anomalies'. Are they really biological, or do they perhaps reflect differences in scientific method (e.g. lumpers *versus* splitters), or disparity in the palaeoenvironmental, palaeogeographical or stratigraphical coverage of phytoplankton collections?