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Fossil algae vs Living algae: results from the study of Charophytes

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The comparison of fossil Algae with their modern analogues raises a number of questions that are of general interest in palaeontology and are answered in different ways depending on the group studied. On the whole, many organisms become only partly fossilised and often do not contain the significant characters used for the systematics of their living equivalent. The question is: how to obtain a *"natural classification*" of those fossils ?

In the case of the charophytes, sensu Charales, the palaeobotaical systematics is based on the gyrogonites, that is the calcified female fructifications, which provide the only determinable fossil remains for this order. However the living charophytes are classified according to characters of the plant which are not preserved in the fossil state.

Study at the interface Extant/Fossil has shown that the living genera display very distinctive fructifications and can be accurately determined from their gyrogonites even in absence of plant remains (Soulié-Märsche, 1989).

At species level, the parallelism is more difficult to establish because the gyrogonites display morphological variation in response to environmental differences. In order to determine correctly the subfossil and quaternary gyrogonites that are related to still living taxa, the range of ecological variation has to be calibrated through the study of abundant gyrogonite populations from modern lakes and ponds with various physico-chemical conditions. These investigations should help limiting the number of fossil morpho-species simply based on minor morphological differences.

The knowledge of the range of inter-population variation that a given modern species is able to produce shows that many fossil morphologies distinguished as separate species potentially could have belonged to one species and should be grouped. Better understanding of the relationship between environmental factors and morphology of the gyrogonites also increases the significance of fossil charophytes in terms of environmental change and contributes to reconstructing former aquatic habitats.

The aim of this presentation is to give rise to discussion about the different nomenclatural solutions adopted in various groups of fossil algae in order to correlate the fossil representatives to their modern analogues.

References

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