

## **An introduction to Charales**

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From an evolutionary point of view Charales are located between two worlds: still being green algae, they share many features with land plants, which evolved from their ancestors about 470 million years ago. Because of their phylogenetic position Charales are marvellous model organisms for studying aspects of adaptation to terrestrial life style of plants.

Nevertheless, they are also puzzling for several reasons. Being phylogenetically very old, their recent appearance is probably the result of many evolutionary bottlenecks they have passed.

A notable feature related to Charales is the overwhelming morphological complexity in these group, allowing specialists to describe more and more taxa just by concentrating on tiny details, which are hardly recognized by field scientists, being confronted with the full range of variability of characters.

Moreover, in Charales some links between morphology and ecological niche structure are striking, but still not fully understood; for example, it seems that the most ancient members represent the most complex morphologies whereas modern forms are simplified.

Even more puzzling are the aspects of generative reproduction; morphologically complex gametangia and still not fully understood life-cycles fuel debates about taxonomy of these group for more than half of a century without any compromise in sight. In this lecture consequently an introduction into ontogenesis of Charales will back up the presentation of systematics (and problems with it), ecology and reproduction.