

Abstract

This thesis deals with the morphological asymmetry of the desmid genus *Micrasterias* (Desmidiaceae, Viridiplantae). In total, 71 populations belonging to 13 species sampled at 31 different locations were used.

In addition to the traditional approach of the biradial asymmetry decomposition (joint PCA of the symmetric copies of all the cells) a novel approach based on a PCA of the symmetric copies of each cell separately was also used. Both these methods were found to be replaceable, but the second method may have broader applications.

The dominant asymmetric pattern was described by the differences in shape of the opposite semicells, i.e. those segments that represent the juvenile and adult parts of the cells. Cellular ontogenesis of semicells is separated in time and, therefore, this asymmetry may be determined by varying abiotic conditions. However, a part of this asymmetric pattern would also be explained by ontogenetic differences among mature and developing semicells. The asymmetry between the left and right part of the cells, as well as the transversal asymmetry proved to be less conspicuous. Relative representation of the different asymmetric patterns between populations proved to be relatively stable.

Morphological complexity did not correlate with the asymmetric levels. This means that the morphogenesis of even the most complicated *Micrasterias* cells was not accompanied by inherent ontogenetic inaccuracies. The different asymmetrical trends among species were recorded, but these trends were likely related to size differences among species, as the degree of asymmetry proved to be strongly positively correlated with their cell sizes. The joint asymmetric trends in sympatrically occurring species indicated that evolutionarily conserved features shared by multiple species may have been preserved in the *Micrasterias* lineage.

Key words: allometry, asymmetry, complexity, Desmidiaceae, geometric morphometrics, *Micrasterias*