**Thesis report Petra Vinšová**

**Taxonomy, diversity and ecology of freshwater diatom communities (Bacillariophyta) from moss habitats of Gough Island (southern Atlantic Ocean)**

The thesis by Petra Vinšová deals with the diatom analysis (taxonomy and ecology/biogeography based on counts) of a large amount of moss samples from Gough Island (and also some samples from Tristan da Cunha and Inaccessible Island). It is clear that a large amount of work has been done, and the standard of taxonomic analysis is solid and exemplary. The descriptions and illustrations are excellent, which is essential to support the important biogeographical implications of the thesis (see below).

The introduction (chapter 1) provides an excellent and well-referenced overview of the state-of-the-art about the study areas and contemporary aspects of diatom taxonomy and biogeography. I especially appreciated the critical parts about diatom species delimitation and about the current controversies related to diatom biogeography.

Chapter 2 describes the ecological methods and results. It is clear that a large amount of methods have been used (clustering, PCA, dbRDA, similarity analyses), and maybe not all are necessary as they often convey the same messages. In the cluster and PCA figures (Figs 2.3 and 2.4) it would have been good to respectively show the groups and explain which colours refer to which groups (also in the PCA, the full names of the diatom species – at least the most important ones - would have been more useful). In Fig 2.7, it would have been nice to also include the most important species/genera.

Chapter 3 deals with a detailed LM and SEM description (of excellent quality) of a single Pseudoeunotia species described by Carter, which is transferred to the genus Eunotia.

Chapter 4 discusses the possible occurrence of semicryptic entities in a species complex belonging to the genus *Frustulia*. I am not familiar with the morphometric methods used but it is clear that such methods are the way forward to objectively separate semicryptic entities (as species hypotheses) within diatom species complexes in the absence of molecular data. Unlike the previous chapters, this chapter is quite lengthy and could be reduced to increase readability. Are all approaches necessary to bring the main message across? It is also not clear to me how (p. 73/74) the effect of length was removed from the analyses. Also, reference is made to 'centroid size' (p. 73) but it is not clear to me what this represents (it is not explained elsewhere in the text).

Chapter 5 summarizes and integrates the main results of the thesis, and present a nice overview of the work performed. The results are very important from a biogeographical point of view, and complement the already extensive body of information on diatom biogeograpy in the Southern Hemisphere.

The appendices in themselves testify of the huge amount of detailed taxonomic analyses performed in this study.

The thesis is overall very well-written and carefully edited. This is an excellent thesis, and I suggest (depending on the defense) a top mark for this piece of work.

Some potential questions for the defense:

- Is anything known about the geological age of Gough Island (and the other islands in the archipelago)?
- Are there any indications for the introduction of diatom species on the island since human colonization, and would paleolimnology be able to resolve this issue? Are there any permanent water bodies on the island?
- What do you suggest should be done with the genus Pseudoeunotia, as it appears to be empty now?
- It seems to me that at least three of the Frustulia morphotypes represent good morphospecies (differences in valve shape while having overlap in size and width). Why would you refrain from describing these as new species? Do you really think the observed variation could be related to environmental factors?

Koen Sabbe
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