**SEMI-CRYPTIC DIVERSITY IN A NON-MONOPHYLETIC LICHEN GENUS:**

**A MOLECULAR PHYLOGENETIC STUDY OF *Calvitimela***

Markus Osaland Felde1; Mika Bendiksby1,2; Reidar Haugan1; Einar Timdal1

1Natural History Museum, University of Oslo, Norway;2Norwegian University of Science and Technology, Norway; \*Email: markusof@uio.no

Resolving the relationships between genera in the lichen family Tephromelataceae has proven difficult and the taxon limits within the genus *Calvitimela* are only partly understood. In this study, we test the monophyly of *Calvitimela* and provide recommendations for an updated classification of the genus through an integrative taxonomic approach. Freshly collected material from Norway and fungarium specimens of all species currently assigned to *Calvitimela* (including available holotype and isotype material) formed the foundations for the study. Additional population sampling of *Calvitimela melaleuca* s. lat. was performed to investigate the relationship between secondary metabolite chemistry and genetic lineages recovered by the ITS marker. Chemical and morphological characters were analyzed to test their diagnostic values in the genus. More than 300 sequences from five different loci (ITS, LSU, MCM7, mtSSU, TEF1-α) were produced and used, together with existing molecular data, to infer phylogenetic relationships in *Calvitimela*. Our molecular phylogenetic results show that the *C. armeniaca-melaleuca* species complex constitutes four distinct genetic lineages. Moreover, detailed morphological examinations of *C. melaleuca* s. lat. reveal differences between taxa previously assumed to be morphologically cryptic. Secondary metabolite chemistries are found to be overlapping between divergent genetic lineages across the genus. Population level analyses of *C. melaleuca* s. lat. corroborates both phylogenetic and chemical results. Phylogenetic analysis of the mtSSU suggests that the Antarctic species *C. uniseptata* belongs in *Thamnolecania* (Ramalinaceae). One new grouping in the *C. aglaea* complex, phenotypically close to *C. perlata*,is recognized and proposed as a new species. We also find molecular evidence for *C. septentrionalis* being sister to *C. cuprea*. We discuss the role of cryptic diversity in an evolutionary context and explore the potential reasons for non-monophyly in *Calvitimela* and poor intergeneric resolution in the family Tephromelataceae.