Title: A Deep Hidden Diversity of Dictyostelia<!–<RunningTitle>Deep Hidden Diversity of Dictyostelia</RunningTitle>–>

Authors: Sandra L. Baldauf, Maria Romeralo, Omar Fiz-Palacios, Nahid Heidari

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ORIGINAL PAPER

A Deep Hidden Diversity of Dictyostelia

Running title: Deep Hidden Diversity of Dictyostelia

Sandra L. Baldauf[1], Maria Romeralo, Omar Fiz-Palacios, and Nahid Heidari

Department of Systematic Biology, Evolutionary Biology Centre, Norbyvägen 18D, University of Uppsala, SE-75236 Uppsala, Sweden

[1]Corresponding author; fax +46 184 71 64 57
e-mail sandra.baldauf@ebc.uu.se (S. L. Baldauf).

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Dictyostelia is a monophyletic group of transiently multicellular (sorocarpic) amoebae, whose study is currently limited to laboratory culture. This tends to favour faster growing species with robust sorocarps, while species with smaller more delicate sorocarps constitute most of the group's taxonomic breadth. The number of known species is also small (~150) given Dictyostelia's molecular depth and apparent antiquity (>600 myr). Nonetheless, dictyostelid sequences are rarely recovered in culture independent sampling (ciPCR) surveys. We developed ciPCR primers to specifically target dictyostelid small subunit (SSU or 18S) rDNA and tested them on total DNAs extracted from a wide range of soils from five continents. The resulting clone libraries show mostly dictyostelid sequences (~90%), and phylogenetic analyses of these sequences indicate novel lineages in all four dictyostelid families and most genera. This is especially true for the species-rich *Heterostelium* and Dictyosteliaceae and but also the less species-rich Raperosteliaceae. However, the most novel deep branches are found in two very species-poor taxa, including the deepest branch yet seen in the highly divergent Cavenderiaceae. These results confirm a deep hidden diversity of Dictyostelia, potentially including novel morphologies and developmental