2-O03-1

Notes, outline and divergence time of Basidiomycota

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Basidiomycota constitutes a major phylum of the kingdom Fungi, which is second in species numbers to the Ascomycota. Our work attempts to provide an overview of all valid, currently used Basidiomycota genera published so far in a single document and the divergence times of families and the above. In this study, an outline of basidiomycota was presented which included 1928 valid, currently used genera with 1261 synonym names, which are from 241 families, 68 orders, 18 classes and 4 subphyla. For these 1928 valid genera, we provided a brief note for each genus including information of their classification, accepted species number, type species, life mode, habitat, distribution, and sequence information. Furthermore, totally 771 species from 60 orders and 185 familes were included in the phylogenetic and dating analyses. Three datasets of subphyla Agaricomycotina, Pucciniomycotina and Ustilaginomycotina were made respectively, which composed of six-gene (LSU, SSU, 5.8s, rpb1, rpb2, ef1) sequences, and their dating analyses were carried out. Our study indicated divergence times of subphyla in Basidiomycota are 406-430 Ma, classes are 211-383 Ma and orders are 99-323 Ma which were generally similar to the previous study. In this study all phylogenetic supported families were dated, the results showed the familied from Agaricomycotina diverged during 49-226 Ma, Pucciniomycotina diverged during 85-222 Ma and Ustilaginomycotina 79-177 Ma. Those divergence times as an additional criterion in ranking would provide a clue to resolve the taxonomic problems in the present taxonomic system, and also provide the knowledge to better understanding the phylogeny and the evolution events in Basidiomycota.