

Unveiling a Rare Fungistic Species of *Pseudoomphalina Distantifolia* from Pakistan

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Abstract : Fungi, including mushrooms, are vital components of global ecosystems, contributing to decomposition, nutrient cycling, and symbiotic relationships with other organisms, including plants. Despite their importance, up to 90% of fungal species remain undescribed. The present study highlights the importance of continued exploration and research into fungi. It provides the first insight into the systematics of mushrooms in Ayubia National Park, Pakistan, revealing a diversity-rich but relatively unexplored area that harbors many fungal taxa. The fungal samples were collected from Pakistan's Himalayan moist temperate coniferous forests from 2018 to 2020. The collected samples were cleaned, photographed and identified using appropriate morphological keys for further analysis. DNA from dried samples was extracted using a modified CTAB method and amplified through PCR. The ITS region of collected samples was sequenced and analyzed using BLAST, MAFFT, and Sequencher software. Maximum likelihood phylogenetic analysis was performed using MEGA-X and CIPRES. A distinct and rare fungistic species of *Pseudoomphalina* was discovered during the present study, characterized by its small to medium-sized fruiting bodies, campanulate to convex caps, distant lamellae, large apiculate basidiospores (7.5-16.5×4.0-7.3 μm) and smaller, narrowly-clavate to clavate cheilocystidia. The described taxon was illustrated through macro and microscopic examinations along the phylogenetic analysis (with those of closely related North American and European species) that revealed its distinct characteristics, confirming its status as a rare species within the *Pseudoomphalina kalchbrenneri* complex. The present study will provide the baseline data for researchers, scientists and land managers to mitigate challenges in research, ecosystem stability and food security for a tremendously increasing population.

Keywords : BLAST, conservation biology, Himalayan Forest of Pakistan, ITS, omphalinoid, phylogeny, systematics

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