Overview of *Xanthoparmelia* taxa from South Korea including the description of two new species (Parmeliaceae, Ascomycota)

UDENI JAYALAL1, PRADEEP K. DIVAKAR2, SANTOSH JOSHI1, SOON OK OH1, JUNG A KIM1 & JAE-SEOUN HUR1,3

1Korean Lichen Research Institute, Sunchon National University, Sunchon 540–742, Korea  
2Departamento de Biología Vegetal II, Facultad de Farmacia, Universidad Complutense de Madrid, Plaza de Ramón y Cajal s/n, 28040 Madrid, Spain  
3Author for correspondence, email:jshur1@sunchon.ac.kr

Abstract

In the genus *Xanthoparmelia*, species boundaries are based on morphological and chemical features such as the presence and/or absence of secondary metabolites, diagnostic reproductive structures, isidia morphology, and color of lower surface. Two new species of *Xanthoparmelia* are described from South Korea, *X. kolriana* with cylindrical isidia containing atranorin and salazinic acid as major components in the medulla together with cortical usnic acid, while *X. volcanicola* is characterised by a red coloured medulla, and subglobose isidia. The characteristics of *Xanthoparmelia* species and their distribution in South Korea are outlined and an identification key given. Additionally, we used ITS ribosomal DNA sequences to assess the monophyly of *Xanthoparmelia* species from South Korea. Our results reveal that traditionally circumscribed species were not recovered as monophyletic clades. Further, we here show that ITS is insufficient to estimate a well-supported phylogenetic hypothesis, but suggests that traditional taxonomy may not reflect natural groups. This communication provides an important framework for future studies assessing species boundaries in *Xanthoparmelia* species in South Korea.

Key words: ITS rDNA, molecular phylogeny, new species, endemic species, character distribution, pigmented medulla, volcanic rock

Introduction


Early molecular studies carried out by Crespo et al. (2001) revealed that species from the genera *Xanthoparmelia*, *Neofuscelia*, *Paraparmelia* and *Chondropsis* were recovered together within a single large clade. On the basis of these findings, the older generic name of *Chondropsis* was transferred to the genus *Xanthoparmelia* by Hawksworth and Crespo (2002). Subsequently, also the genera *Almbornia*, *Karowonia*, *Namakwa*, *Neofuscelia*, *Omphalidiella*, *Paraparmelia*, *Placoparmelia* and *Xanthomaculina* were synonymized with *Xanthoparmelia* (Elix 2003b, Blanco et al. 2004, Thell et al. 2006, Amo de Paz et al. 2010 a, b).

Although *Xanthoparmelia* species occur commonly throughout Asia, specimens from Asia have been poorly represented in molecular phylogenetic analyses to date. Twenty-eight *Xanthoparmelia* species have been recorded for China, including Hong Kong (Wei 1991, Aptroot & Sipman 2001), nine for Japan (Harada et al. 2004), two for Thailand (Wolseley et al. 2002) and three species for Taiwan (Wei 1991). *Xanthoparmelia* is particularly well represented in the Korean Peninsula, while only three species have been recorded for North Korea, including *X. subramigera* (Gyeln.)
Acknowledgments

We thank Jack Elix for valuable advice and comments on HPLC chromatograms, Ms. Min-Hye Jeong for the HPLC analysis and Ms. Jung Shin Park for providing data on some localities. We also thank two anonymous reviewers for valuable comments and suggestions that improved the manuscript. This work was supported by a grant from the Korean National Research Resource Center Program (NRF-2014M3A9B8002115), and the Korean Forest Service Program (KNA 2014) through the Korea National Arboretum. PKD thanks the Spanish Ministerio de Ciencia e Innovación (CGL2010-21646/BOS) and Comunidad Autónoma de Madrid (REMEDINAL S-2009/AMB-1783) for financial support.

References

http://dx.doi.org/10.1017/s0024282905015197
http://dx.doi.org/10.1109/TAC.1974.1100705
http://dx.doi.org/10.1639/0007-2745-113.2.376
http://dx.doi.org/10.1017/S0024282905014829
http://dx.doi.org/10.2307/4135563
http://dx.doi.org/10.2307/1223708
http://dx.doi.org/10.1017/S0024282911000570
http://dx.doi.org/10.1017/S0024282999000675


Rambaut, A. (2009) FigTree 1.2.2 [computer program]. Website http://tree.bio.ed.ac.uk/software/figtree/.


