

New Lichen species reveals ancient symbiosis in the Western Ghats

Posted On: 18 JUL 2025 5:31PM by PIB Delhi

A team of Indian scientists has uncovered a previously unknown species of lichen, *Allographa effusosoredica*, from the richly biodiverse Western Ghats, carrying within it a tale of symbiosis, evolution and resilience.

Lichens are not just one organism but two (sometimes more) living in intimate symbiosis: a fungus that offers structure and protection, and a photobiont (usually a green alga or cyanobacterium) that captures sunlight and makes food. Despite their humble appearance, lichens play critical roles in ecosystems, building soil, feeding insects and serving as nature's bioindicators.

The study by MACS-Agharkar Research Institute, Pune, an autonomous institute of the Department of Science & Technology (DST), Government of India, combined classical taxonomy with modern molecular tools, setting new molecular benchmarks for the genus in the region.

The newly identified species, a crustose lichen with striking effuse soredia and comparably rare chemical traits, (harbouring chemical called norstictic acid, considered rare in comparison to other morphologically similar species within the genus *Allographa*) was studied in detail using morphological, chemical and advanced molecular techniques. This integrative approach also unveiled its algal partner, a *Trentepohlia* species, adding to the sparse but growing understanding of photobiont diversity in tropical lichens.

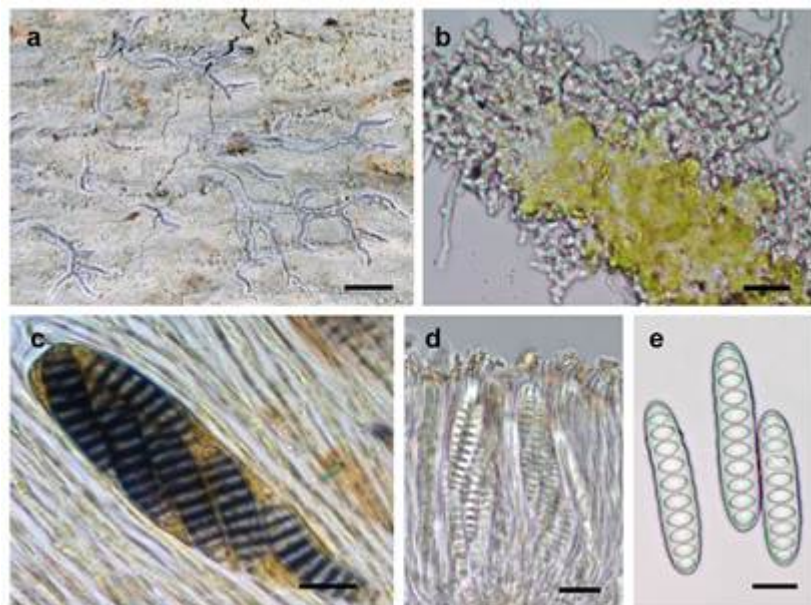


Fig: *Allographa effusosoredica* a. Thallus, b. soredia, c. ascus showing I+ blue ascospores, d. clear hymenium, e. ascospores.

Using DNA sequencing across multiple genetic markers (mtSSU, LSU, RPB2 for the fungal partner and ITS for the algal symbiont), the researchers placed *A. effusosoredica* phylogenetically close to *Allographa xanthospora*. Interestingly, the lichen's morphology mimics that of *Graphis glaucescens*, raising evolutionary questions about generic boundaries in the *Graphidaceae* family.

“This is the first Indian species of *Allographa* ever sequenced from India (This species, discovered in India, is the first *Allographa* from the country to be supported by molecular data.,” says the study team, which includes

researchers. “It also sheds light on lichen-algal symbiosis, reinforcing the concept of locally adapted photobionts.”

The study, led by **Ansil P. A., Rajeshkumar K. C., Sruthi O. P., and Bharati O. Sharma**, marks a major step forward in understanding symbiotic life forms and their hidden genetic complexity. It contributes to India’s growing lichen inventory. This publication arises from a research project sponsored by the Anusandhan National Research Foundation (ANRF) (formerly SERB), titled *"Unravelling the symbiosis of algal and fungal partners in lichen family Graphidaceae and Parmeliaceae from the Western Ghats through polyphasic taxonomic approach and ecological studies"*.

Allographa effusosoredica becomes the 53rd species from the genus reported from India and the 22nd from the Western Ghats alone. The study emphasizes the urgent need for more molecular work on Indian lichen diversity, especially in biodiversity hotspots.

NKR/PSM

(Release ID: 2145823)