**SYSTEMATICS AND ECOLOGY OF SOUTH AFRICAN GRAPHIDACEAE AND THEIR TRENTEPOHLIACEAE PHOTOBIONTS**

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South Africa hosts a diverse lichen biota currently documented to include approximately 1800 species in over 260 genera, and estimates place the country’s total lichen biodiversity at 2500–3000 species. African macrolichens are particularly well-documented, but detailed studies of crustose lichens are limited even for taxa, such as the family Graphidaceae, that have received extensive attention elsewhere in the world. We conducted a systematic investigation of the lirelliform Graphidaceae in South Africa with two primary goals: first, to document species distributions and ecology, and to infer their phylogenetic history, in a region known to be a biodiversity hotspot for other organisms; second, to investigate patterns of mycobiont–photobiont specificity in Trentepohliaceae-associated lichens at a regional scale. The current South African checklist includes 27 species of lirelliform Graphidaceae, but our data show that the species richness of this family is at least two-fold larger and that many currently reported names are misapplied. In South Africa, most species of lirelliform Graphidaceae belong to *Graphis*, which occurs principally in closed forests, and *Phaeographis*, which predominates in open, coastal vegetation. New taxa include a species of *Allographa* that produces the unusual secondary metabolite hirtifructic acid and is endemic to mistbelt forest fragments in eastern South Africa, a new species in the *Graphis scripta* complex whose morphology was predicted by previous research, and a potential new saxicolous genus endemic to the Cape Floristic Region. Our study also sheds light on the Australasian connections of the South African lichen biota, including the first record of *Mangoldia* outside Australasia. Finally, we present data on the Trentepohliaceae species associated with these lichens to address the relative influence of mycobiont evolution and habitat on photobiont identity and vice versa. Preliminary data suggest that *Phaeographis* has a fairly narrow photobiont specificity irrespective of habitat, while *Graphis* is a photobiont generalist.