

## Smelling Our Way through Names: Understanding the Potential of Floral Volatiles as Taxonomic Traits in the Fragrant Ginger Genus *Hedychium*

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**Abstract :** Plants, due to their sedentary lifestyle, have evolved mechanisms to synthesize a huge diversity of complex, specialized chemical metabolites, a majority of them being volatile organic compounds (VOCs). These VOCs are heavily involved in their biotic and abiotic interactions. Since chemical composition could be under the same selection processes as other morphological characters, we test if VOCs can be used to taxonomically distinguish species in the well-studied, fragrant ginger genus -*Hedychium* (Zingiberaceae). We propose that variations in the volatile profiles are suggestive of adaptation to divergent environments, and their presence could be explained by either phylogenetic conservatism or ecological factors. In this study, we investigate the volatile chemistry within *Hedychium*, which is endemic to Asian palaeotropics. We used an unsupervised clustering approach which clearly distinguished most taxa, and we used ancestral state reconstruction to estimate phylogenetic signals and chemical trait evolution in the genus. We propose that taxonomically, the chemical composition could aid in species identification, especially in species complexes where taxa are not morphologically distinguishable, and extensive, targeted chemical libraries will help in this effort.

**Keywords :** chemotaxonomy, dynamic headspace sampling, floral fragrance, floral volatile evolution, gingers, *Hedychium*

**Conference Title :** ICEEFSFV 2023 : International Conference on Ecology and Evolution of Floral Scent and Floral Volatiles

**Conference Location :** Cape Town, South Africa

**Conference Dates :** November 06-07, 2023