Evolution of floral scents in a nursery pollination mutual

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Abstract

Flower scents have a well-demonstrated role as major signals in structuring pollination interactions. Most studies of chemical mediation between plants and pollinators highlight the direct impact of pollinator-mediated selection on the composition of flower scents. Nevertheless, phylogeny may also constrain flower scent composition and thereby the evolution of the emitted signal. Using a model system with obligate pollination interactions, the mutualism between figs and their species-specific pollinating fig wasps, we tested whether phylogenetic history constrains the composition of plant chemical signals that mediate interactions with pollinators. We collected floral scents from receptive figs using *in situ*headspace extraction from 25 species of several sub-genera of *Ficus*from different tropical and subtropical regions, and analyzed their chemical composition using gas chromatography / mass spectrometry. Using a previously reconstructed phylogeny of the genus *Ficus*, we analyzed the phylogenetic signal exhibited by semi-quantitative flower scents data by applying phylogenetic principal component analysis (pPCA) and Kmult tests. When considering only the major compounds emitted by each species (*i.e.*compounds representing more than 5% of the total scent), no phylogenetic signal was revealed. By contrast, when we considered all the VOCs emitted by figs, a significant phylogenetic signal was detected. Our results therefore suggest that there is a significant phylogenetic conservatism in the VOCs emitted by figs, probably due to constraints in the evolution of some biosynthesis pathways, but this signal is mainly due to minor compounds, while closely related species tend to emit different blends of major compounds, probably as a consequence of pollinator- mediated selection.

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