

A fungal endophyte alters poplar leaf chemistry, deters insect feeding and shapes insect community assembly

Christin Walther¹, Marine Vallet², Michael Reichelt³, Prajakta Giri⁴, Beate Rothe⁴, Pamela Medina van Berkum⁵, Jonathan Gershenzon³, and Sybille Unsicker¹

¹University of Kiel Botanical Institute and Botanical Garden

²Friedrich-Schiller-Universität Jena

³Max Planck Institute for Chemical Ecology

⁴Max-Planck-Institute for Chemical Ecology

⁵WUR

March 28, 2024

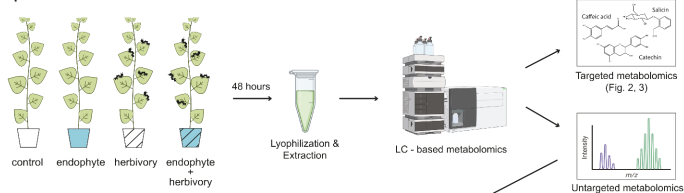
Abstract

The endophytic fungi of certain grasses and other herbaceous plants have long been known to provide plants with anti-herbivore defense compounds, but there is little information about whether the endophytes of trees also engage in such mutualisms. We investigated the influence of the endophytic fungus *Cladosporium cladosporioides* on the chemical defenses of black poplar (*Populus nigra*) trees and the consequences for feeding preference and fitness of herbivorous insects and insect community assembly. Endophyte colonization increased both constitutive- and induced poplar defenses. Generalist *Lymantria dispar* larvae preferred and performed better on uninfected over endophyte-infected poplar leaves, most likely due to higher concentrations of salicinoids in endophytic leaves and the endophyte-produced alkaloid stachydrine. Under field conditions, the endophytic fungus also shapes insect community assembly in young black poplar trees. Our results show that endophytic fungi can play a major role both in defending trees against herbivorous insects and in structuring insect communities.

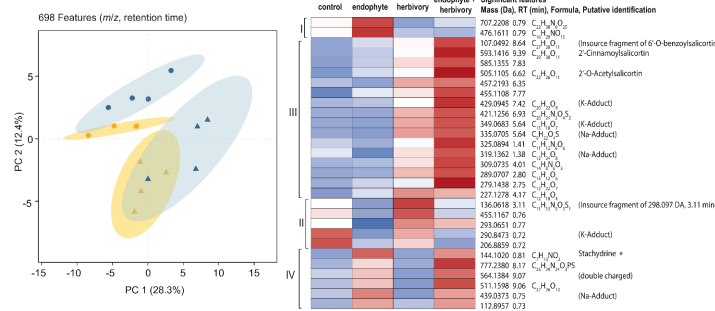
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(a) Experimental scheme and workflow



(b) Positive polarity



(b) Negative polarity

