

Cell wall remodeling enables fungal network development in grasses

December 2 2021



Plant phenotype of *Lolium perenne* infected with *Epichloë festucae* wild type (WT), $\Delta cdaA$, $\Delta cdaB$, and $\Delta cdaA\Delta cdaB$ mutants. Credit: Nazanin Noorifar, Matthew S. Savoian, Arvina Ram, Yonathan Lukito, Berit Hassing, Tobias W. Weikert, Bruno M. Moerschbacher, and Barry Scott

Scientists now have a deeper understanding of how a fungus develops a

symbiotic lifestyle inside grass leaf and why the grass leaf fails to defend itself against the intruder, thanks to research coming from Massey University in New Zealand and the University of Münster in Germany.

Fungal endophytes of the *Epichloë* species are known to form symbiotic associations with aerial tissues of cool season grasses. These endophytes form networks within the leaf sheath and blade as well as the flower stems and play an important role in protecting the grass from biotic and abiotic stresses, including insects and drought.

When observing this relationship between these fungal endophytes and perennial ryegrass, scientists noticed that [chitin](#), which primarily makes up cell walls in fungi, was depleted or modified once the endophytes infected the [grass](#). They found instead that these cell walls contained chitosan, a natural plant defense activator derived from chitin. Once the endophytes exit the leaf to grow on the [leaf](#) surface, chitin is once again found in the cell walls.

"These observations suggest that conversion of chitin to chitosan is crucial for the symbiotic lifestyle," explains scientist Barry Scott. "This conversion possibly suppresses a host defense response."

This is the first study to show the role of [cell wall](#) remodeling of chitin to chitosan in a plant-associated symbiotic fungus and helps explain why the plant host fails to elicit any major host defense response.

"A better understanding of these associations will help develop new strategies and technologies to protect [natural ecosystems](#) and benefit agriculture," Scott adds.

This article is important for those who study fungal-plant interactions and provides an entirely new perspective on how fungi can live in symbiotic association with plants.

"Chitin Deacetylases Are Required for *Epichloë festucae* Endophytic Cell Wall Remodeling During Establishment of a Mutualistic Symbiotic Interaction with *Lolium perenne*" is published in the open access *MPMI* journal.

More information: Nazanin Noorifar et al, Chitin Deacetylases Are Required for *Epichloë festucae* Endophytic Cell Wall Remodeling During Establishment of a Mutualistic Symbiotic Interaction with *Lolium perenne*, *Molecular Plant-Microbe Interactions* (2021). [DOI: 10.1094/MPMI-12-20-0347-R](https://doi.org/10.1094/MPMI-12-20-0347-R)

Provided by American Phytopathological Society

Citation: Cell wall remodeling enables fungal network development in grasses (2021, December 2) retrieved 25 April 2024 from <https://phys.org/news/2021-12-cell-wall-remodeling-enables-fungal.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.