

Pathogen strains competing for the same host plant change disease dynamics

January 8 2015

The epidemics caused by coinfection of several pathogen strains in a plant population is more severe than epidemics caused by single strains.

A plant individual may be simultaneously infected by several pathogen strains, each aiming for optimal survival and reproduction. This competition may come at the cost of the well being of the host as higher host exploitation rates may increase host mortality. However, killing the host should not be in the interest of the pathogen that requires living host tissue for survival.

Academy Research Fellow Anna-Liisa Laine working at the University of Helsinki has an explanation for this puzzling phenomenon. "Rapid host exploitation rates may be favored under coinfection where the strains are competing for the same limited resources. Strains that are playing fair lose to those most quickly exhaust the host," she says.

Anna-Liisa Laine and her research group have been studying the interaction between [host plant](#) ribwort plantain, *Plantago lanceolata*, and its powdery mildew pathogen across hundreds of populations. They've discovered that coinfection by several strains of the same host plant are common in the wild with more than half of the pathogen populations supporting coinfection.

Experimental work coupled with field surveys of infection show that those host populations supporting coinfection suffer more severe epidemics than those where a single pathogen strain is present. A spore

trapping experiment confirmed that the change in epidemiological dynamics is explained by higher spore production rate under coinfection.

These results confirm classic predictions of how infection dynamics can fundamentally change under coinfection. The study also highlights how important it is to account for coinfection - which can be spatially and temporally variable - when designing disease prevention efforts.

"Here we find that coinfection by different [strains](#) of the same pathogen species completely change infection dynamics. These results are really just scraping the surface of how complex infection dynamics can be under coinfection. In our current work we've discovered that ribwort plantain populations in Finland contain hundreds of viruses. We're now measuring how this within host disease community affects infection dynamics for a wide range of pathogen species," says Anna-Liisa Laine.

The study is published in *Nature Communications*.

Provided by University of Helsinki

Citation: Pathogen strains competing for the same host plant change disease dynamics (2015, January 8) retrieved 18 April 2024 from <https://phys.org/news/2015-01-pathogen-strains-host-disease-dynamics.html>

<p>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.</p>
--