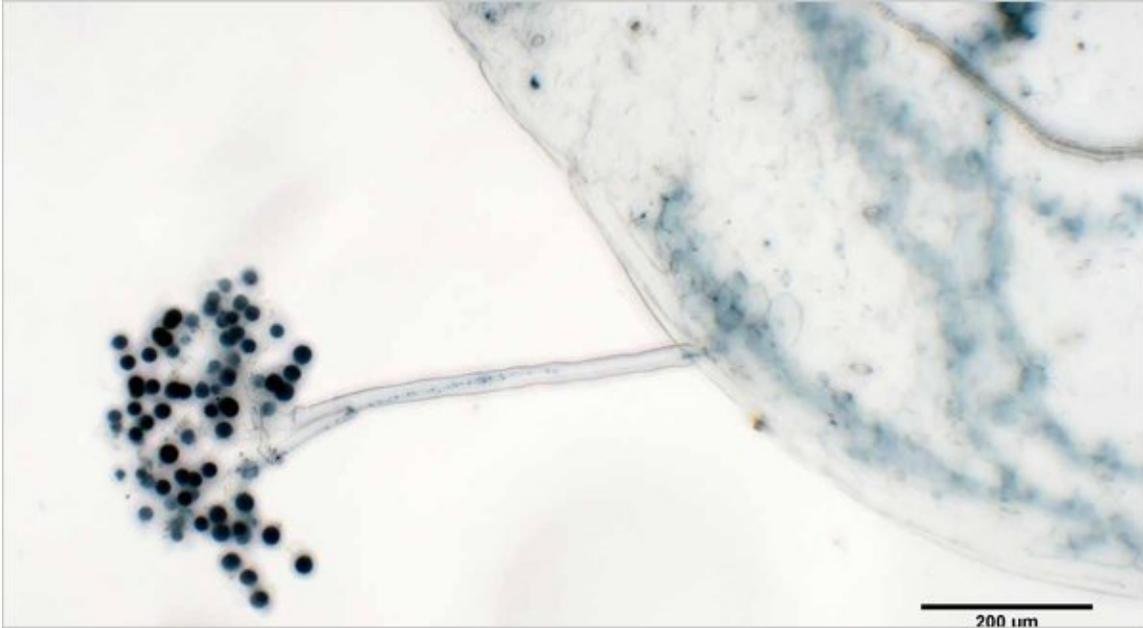


To Defend Against Disease, a Plant Checks the Clock



An Arabidopsis plant with downy mildew disease, caused by a fungus-like pathogen.

Plants, like many other organisms, have circadian clocks that help them anticipate various environmental and biological events that occur at precise times of the day. Processes like photosynthesis, fragrance emission and time of bloom are all regulated by this timekeeping mechanism.

Now, researchers report in the journal Nature that genes in certain plants fend off infections with the help of the clock as well.

Twenty-two genes in the plant Arabidopsis, all connected to the plant's ability to resist infection, were expressed only from the evening onward, peaking at dawn. The timing corresponds with the formation of spores in a fungus like pathogen that attacks the plant and results in a condition known as downy mildew disease. The disease weakens the plant and forms an unsavory coating of fuzzy mildew.

“From what we know, the pathogen forms spores at night and disseminates them at dawn, so that's when the infection threat is highest,” said [Xinnian Dong](#), a biologist at Duke University, and one of the study's authors.

During the day, when the pathogen is not likely to attack, the genes were not expressed.

This is the first time researchers have been able to make a functional connection between the circadian clock and pathogen resistance, Dr. Dong said.

She believes that if researchers can sort out the intricacies of the relationship between pathogens and hosts, and their circadian rhythms, there may be practical applications.

Pesticide treatments could be timed to have maximum impact, for instance. Or it may even be possible to determine ideal times for administering medications in humans, she said.

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