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The Mushrooms, My Friend, are Blowing in the Wind…

Research at the APS Division of Fluid Dynamics Meeting in Pittsburgh Shows How the Mushroom Spews Its Spores

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Press Contact:
Jason Socrates Bardi
+1 240-535-4954
dfdmedia@aps.org
@jasonbardi

WASHINGTON D.C. Nov. 25, 2013 -- Plants use a variety of methods to spread their seeds, including gravity, forceful ejection, and wind, water, and animal dispersion. But what of the mushrooms, whose spores also need to be strewn far and wide to ensure their propagation?

Biologists have long thought that the spores produced by a mushroom's cap simply drop into the wind and blow away. The problem with that notion, said Emilie Dressaire, a professor of experimental fluid mechanics at Trinity College in Hartford, Conn., is that spores can be dispersed even when the air is still. So how do the mushrooms do it? Dressaire, along with Marcus Roper of the University of California, Los Angeles (UCLA), believe they have found the answer: they make their own wind.

Dressaire will present the findings in a talk today at the 66th Annual Meeting of the American Physical Society's (APS) Division of Fluid Dynamics (DFD), held Nov. 24-26, 2013, in Pittsburgh, Pa.

Using high-speed videography and mathematical modeling of spore dispersal in commercially grown oyster and Shiitake mushrooms, Dressaire, Roper, and their students found that the fungi created their wind by releasing water vapor. The vapor cools the air locally, and this creates convective cells that move the air around in the mushroom's vicinity.

Dressaire said these air movements are strong enough to lift the spores clear of the mushroom. As a result, she continued, "mushrooms are able to disperse their spores even in the most inhospitable surroundings."

The team believes this evaporative cooling process might be used to some degree by all

mushroom-producing fungi, including those that cause disease in plants, animals, and humans.

“Most people, even scientists, think of mushrooms simply as machines for producing spores,” Roper said. “The more spores each machine produces, the more likely it to successfully colonize new habitats.” But the new work suggests that there is much more going on.

“Our research shows that these ‘machines’ are much more complex than that: they control their local environments, and create winds where there were none in nature,” Dressaire said. “That’s pretty amazing, but fungi are ingenious engineers.”

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The presentation, “Control of fluidic environments by mushrooms,” is at 11:22 am on Monday, November 25, 2013 in the David L. Lawrence Convention Center Room 306/307. ABSTRACT: http://meeting.aps.org/Meeting/DFD13/Event/203211

MEETING INFORMATION
The 66th Annual Division of Fluid Dynamics Meeting will be held at David L. Lawrence Convention Center in Pittsburgh, Pennsylvania from November 24-26, 2013. More meeting information: http://www.apsdfd2013.pitt.edu

REGISTERING AS PRESS
Any credentialed journalist, full-time or freelance, may attend the conference free of charge. Please email: dfdmedia@aps.org and include "DFD Press" in the subject line. Work space will be provided on-site during the meeting and news and graphics will be hosted on the Virtual Press Room: http://www.aps.org/units/dfd/pressroom/press.cfm

ABOUT THE APS DIVISION OF FLUID DYNAMICS
The Division of Fluid Dynamics of the American Physical Society (APS) exists for the advancement and diffusion of knowledge of the physics of fluids with special emphasis on the dynamical theories of the liquid, plastic and gaseous states of matter under all conditions of temperature and pressure. DFD Website: http://www.aps.org/units/dfd/index.cfm