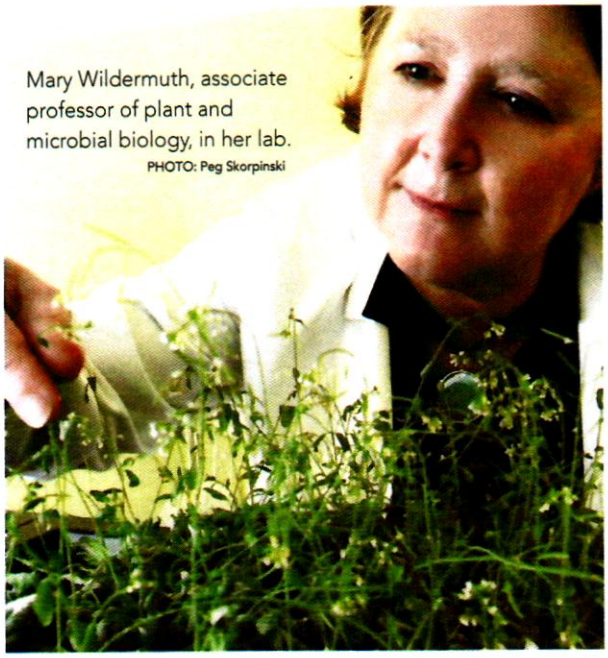


Mary Wildermuth, associate professor of plant and microbial biology, in her lab.
PHOTO: Peg Skorpinski

Protecting Food Crops from Powdery Mildew

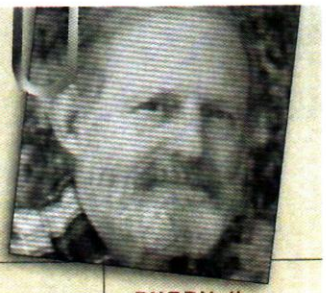
It looks harmless enough—a light dusting like baby powder sprinkled on the leaves. But powdery mildew can cause billions of dollars of crop damage in California. For example, the fast-spreading fungus is the most significant disease affecting grapes in California. Borne by the wind, its spores race through fields, resulting in crop losses of 30 percent or more.

Growers combat powdery mildew with sulfur, fungicides, and other deterrents, but treatment is costly, and timing is difficult. But a much more precise strategy may be on the way. Using highly refined dissection of infected plant cells, coupled with genetic analysis, plant and microbial biology associate professor **Mary Wildermuth** identified genes critical to a plant's response to mildew attack. Her research focuses on plant breeding strategies that can weaken powdery mildew's grip.

Wildermuth is applying her discoveries to protect commercially valuable crops. She uses a plant in the mustard family popular with researchers for its small, sequenced genome and a short life cycle. "We've already identified the parallel genes in a number of important crops," she said. "By targeted breeding to limit these genes' powdery mildew–promoting effects, we should be able to protect plants without extensive chemical treatments." Wildermuth's work is funded from the *Bakar Fellows Program*, which supports early-career faculty conducting commercially promising research.

— ADAPTED FROM AN ARTICLE BY WALLACE RAVVEN

TOP PAPER: ARE professor emeritus **George Judge** was a co-author, with colleagues in the United Kingdom and Russia, on the winning entry for the 2014 Best Paper Award from the journal *Entropy*, it was announced in February.



SUBJECT:

Why I Do Science

ENTRY BY:
Joe R. McBride

ENTRY #:
011

My introduction to science began in junior high school when my biology teacher, Mr. Bradley, inspired a life-long interest in research. The idea that we could test assumptions through experimentation opened a whole new world for me.

My undergraduate work at the University of Montana and my graduate work at Berkeley focused this interest on forest ecology. As a graduate student, I started a career-long pursuit of the effects of land use on plant successions—changes in the structure of plant species over time. I followed patterns of livestock grazing, fire history, air pollution, and stream-flow regulation in a variety of California vegetation types. I have established field plots, analyzed aerial photography, and conducted greenhouse and laboratory experiments.

A compelling aspect of this work has been the evolution of my techniques. Often, my initial approach has led to subsequent experiments in basic plant physiology that I had not anticipated, but turned out to be essential to understanding what was taking place in the field. While I have always intended my findings to be of practical application to vegetation management, somehow parts of it have crossed into the realm of basic science.

Teaching also has been a great stimulus for my research and has kept me up to date. I have always felt an obligation to present currently evolving concepts, and students have been a valuable source of feedback on my work.

My interest in history has led to a number of studies on the development of urban forests in California and the way in which urban forests in Europe and Asia were reconstructed following the devastation of cities during World War II. I am currently investigating the potential impact of global warming on urban forests in California.

Joe R. McBride is a professor in the Department of Environmental Science, Policy, and Management, and in the College of Environmental Design. He is a fellow of the Society of American Foresters and a recipient of Berkeley's Distinguished Teaching Award, among numerous honors.