

Scientists try to solve mystery of chocolate trees' killer

UL LAFAYETTE RESEARCHERS are working to protect the world's supply of chocolate. Roseline Devariste, a graduate student in biology, and her advisor, biology professor Dr. Karl Hasenstein, are learning more about the relationship between a deadly fungus and its host, the chocolate tree.

Trees infected with *Moniliophthora perniciosa* spores develop witches' broom disease, so called because the fungus forms broom-like growths. The chocolate industry — and the global economy connected to it — have suffered major losses from witches' broom. Brazil, once South America's largest producer, lost 70 percent of its crop in just 10 years, for example.



Graduate student Roseline Devariste and biologist Dr. Karl Hasenstein harvest a chocolate tree seed pod at UL Lafayette's Center for Ecology and Environmental Technology.

"I wanted to gain a better understanding of the physiological interactions between this pathogen and the tree itself," said Devariste.

At first, spores infect the tree without any visible problems. "Later on, you might see some green broom, massive growths within the host, but the tree is not dying yet. Then, something happens. This fungus switches its lifestyle and begins feeding off the host," Devariste said.

She grew the fungus in material with varying levels of carbon, mimicking internal conditions in living trees. "The data show nutrition plays a role in the development of the disease," she said. The fungus grew more slowly in material with higher levels of glycerol, a naturally occurring substance.

The results support similar studies but Hasenstein said there's still work to be done. Even though the chocolate tree has been cultivated for thousands of years, it has not been widely studied. "To better understand the disease in general and the interaction between host and pathogen, we need to study the fungus *and* the chocolate tree and how one affects the other," he said.

OCEANNA TRZECIAK-CATES

GOOD GUYS WORK TO GET A STEP AHEAD OF CYBER ATTACKERS

Researchers in UL Lafayette's Center for Advanced Computer Studies are focused on strengthening the nation's cyber infrastructure.

Their goal is to develop a deeper understanding of the cat-and-mouse game played by cyber attackers and cyber defenders.

Their newest project reflects a rare partnership among industry, higher education and government. It is led by Dr. Arun Lakhotia, a professor of computer science and head of the CACS Software Research Laboratory, and Dr. Andrew Walenstein, assistant professor of computer science in CACS.

The pair is collaborating with Dr. Vir Phoha, director of the Center for Secure Cyberspace at Louisiana Tech in Ruston and Dr. Bin Mai of Bowie State University in Bowie, Md.

The group will work with McAfee Labs, a leader in the anti-virus software industry. The Air Force Office of Scientific Research will oversee the three-year project, which is funded by a \$790,000 grant from by the U.S. Department of Defense.

Researchers will develop theoretical models of offensive and defensive strategies used on the Internet. These models will help cyber defenders predict hackers' next moves.

"So far, the defenders have been reactive, scampering to respond to the move by an attacker. The research will change the nature of the game," Lakhotia said.

Rachit Mathur, a McAfee Labs research scientist and one of Lakhotia's former students, will provide the investigators



with insights into mechanisms used by attackers.

Dr. Bradd Clark, dean of the Ray P. Authement College of Sciences at UL Lafayette, said the techniques and strategies used by cyber attackers evolve rapidly.

"Participation of McAfee Labs in an advisory capacity will help ground this research in reality so that the results produced can more directly impact development of defensive technologies," he said.

The involvement of McAfee Labs in the early stages of this project is expected to speed up research.

"We are very excited to participate in this project to help advance the state of research at a faster pace," said Hiep Dang, McAfee Labs' director of anti-malware research. "A deep understanding of the design options of stealth and anti-stealth techniques placed in the context of game theory should provide the industry a new way to design and analyze our defensive technologies."