

# Virus Crime Scene Investigator

People are not the only ones to get sick from viruses. Sometimes viruses attack plants—and the results can be devastating. Take the geminiviruses, for example. These microbes have wiped out entire crops, causing millions of dollars worth of damage.



## Evidence of Guilt

"Members of my own family are farmers. My brother and his wife were affected by geminiviruses," says **Marcia Roye**. "These viruses were first discovered in the 1970s, but until we started our research, little was known about them in Jamaica." A team leader at the Biotechnology Center of the University of the West Indies, Mona in Kingston, Jamaica, Marcia has been studying Jamaican geminiviruses for nearly two decades.

Her research is helping to find ways to stop the virus from spreading. Like crime scene investigators, Marcia and her graduate students find infected plants in fields and bring them back to the lab. There, they use molecular biology tools to identify the virus guilty of infection based on its genetic "fingerprint." So far, they have identified 24 different types of geminivirus that cause havoc in Jamaica. They also discovered that new types of viruses are forming all the time. "Sometimes two different geminiviruses infect the same plant and exchange genetic material. They then become a new virus," she explains.

## Advising Farmers

Geminiviruses infect many crops such as tomatoes, papaya, beans, and cabbage, to name a few. But some varieties of a particular crop—some kinds of tomatoes, for example—are resistant to infection. So, for each virus they have identified, Marcia's team has determined precisely which varieties of crops it destroys. "We can help prevent infection by telling farmers what varieties of crops to plant and not to plant. Sometimes the farmers don't listen though," she says with a laugh.

Marcia learned the molecular techniques necessary for studying geminiviruses during her Ph.D. studies. With a UNESCO-L'Oréal Fellowship, she traveled in 2001 from Jamaica to the laboratory of plant virus expert Douglas Maxwell at the University of Wisconsin-Madison in the United States, where she conducted research. She brought back the methods she learned there; and today the work she and her graduate students are doing is known across the world, and her lab is part of a large international research network of laboratories studying geminiviruses.

## A Mother's Rule

Her achievements are inspiring young students in Jamaica to follow in her footsteps. "My story is similar to theirs—they can relate to that," she says. "If they see I have done it, they know they can do it too." Marcia grew up in a rural part of Jamaica, where few people go to university and even fewer ever meet scientists. "I don't come from a rich family, but education was always very important. My mother would say 'Even if fire is falling from the sky you are going to school,'" she recalls. Eventually, this passion for education led to university, where Marcia decided to study biochemistry. "Part of the attraction was that, with science, I thought I could help people in my community," she explains.

Working in a country like Jamaica provides many opportunities for making a difference. "I have had many opportunities to leave Jamaica and be a researcher in other countries, but the reason I have not left is that I want to have an impact on the next generation," she explains. But there are also challenges. "At a place like Madison, if we needed a reagent, we would get it right away. Here, it can take up to two to three months," she explains.

## Wherever There's a Need

Marcia's attitude is that these kinds of obstacles can easily be overcome. "We have some problems with resources in Jamaica, but there are many ways to get around those problems." She is also quick to take advantage of the expertise of other researchers. "When I read an interesting research paper I will e-mail the scientist who did the work to ask questions and sometimes I go to their lab," she says. "They are always happy to help with what I want to do."

Marcia will soon turn her investigative skill to a new and challenging area of research: the virus that causes AIDS in people. "There is a lot of epidemiological data in Jamaica that tells how many people are infected with the human immunodeficiency virus, but there is still a lot to learn," says Marcia. "That is what drives my research: where there is a need, I see what we can do."

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