Saving Valentine's Day

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University of Florida researchers are on a disease-fighting mission to ensure that the world's favorite confection -- chocolate -- will continue to be a Valentine's Day mainstay.

The enemy is witches' broom, an evil-sounding, tree-deforming disease that threatens the global cacao crop and could affect the supply of chocolate in coming years. Randy Ploetz, a professor of plant pathology with UF's Institute of Food and Agricultural Sciences, and other researchers at UF's Tropical Research and Education Center in Homestead, are working with the U.S. Department of Agriculture to develop new cacao varieties that are resistant to witches' broom.

Witches' broom and other diseases that affect the cacao industry have been disastrous for the economies of cacao-growing regions in Latin America. In less than 10 years, witches' broom has reduced production of cocoa beans in the Bahia region of Brazil -- formerly a leading producer of premium-quality cacao -- by 75 percent and put tens of thousands of farm workers out of work.

The disease, which deforms branches of the cacao tree and affects the pods that contain the cocoa beans from which chocolate is made, is also troublesome in many other areas of South America.

About 20 percent of the world's supply of cocoa beans now comes from Central and South America, and the rest comes from Africa and Southeast Asia. West African nations such as Ivory Coast and Ghana are now the world's leading exporters of cacao, with at least 40 percent of the world's supply produced in Ivory Coast alone.

“So far, witches’ broom is confined primarily to South America, but some fear that the increasing ease of direct travel among tropical countries could lead to the spread of witches’ broom and other cacao diseases around the globe,” Ploetz said.

“The cacao varieties now being grown in West Africa are some of the same types that have been nearly wiped out in Latin America. If witches’ broom were to spread to Africa, it would have a huge impact on the world’s cocoa bean supply,” Ploetz stated.

Spread by spores of a fungus (Crinipellis perniciosa), the disease infects plants on which it produces mushrooms during rainy periods. Controlling the disease with pesticides is difficult because chemical sprays are often not effective in the tropical, heavy-rain conditions under which cacao usually thrives, he said.

Ploetz’s research includes two major goals: understanding genetic and pathogenic diversity of the fungus that causes witches’ broom and identifying resistance to the disease among new and existing cacao genotypes.

He said the worldwide cacao crop is genetically very narrow. Researchers are working to develop a new cultivar that could replace susceptible plants, thereby helping to rebuild the industry in Latin America, and providing insurance should the disease appear in West Africa’s cacao-producing regions.

“Of course, it’s important that we develop disease-resistant cacao strains that also taste good,” Ploetz said. “Research shows that the best-tasting cacao varieties seem to be the most susceptible to witches’ broom.”

Ploetz said that efforts to date to control witches’ broom have been an international collaboration of government and the private sector.

John Lunde, director of international programs for Mars Inc. in Hackettstown, N.J., said the research is important to the cocoa industry, as well as consumers. “The international collaboration and public-private partnerships make this research program unique. We are pleased to provide both scientific expertise and funding to help develop environmentally friendly farming methods that small-holder cocoa farmers can use,” he said.

“We are grateful to Mars Inc. for their generous support of our research to develop environmentally friendly methods to ensure the continued health of cocoa crops worldwide,” Ploetz said.

The Chocolate Manufacturers of America estimates that Americans will spend $3.1 billion on chocolates this year.