Wild tomatoes could unlock secrets of fungus behind irish potato famine, researcher says

February 22 2012

Pat Bedinger

Wild tomatoes could help researchers design potatoes resistant to the fungus that caused the Irish potato famine and still threatens potato crops around the globe, said a Colorado State University biologist who has received a $5.8 million National Science Foundation grant for the research.

The grant is the second major award to Pat Bedinger to study the reproductive processes of flowering plants. In 2006, Bedinger and her

colleagues, including Steve Stack at CSU, were awarded $3.9 million to unlock the secrets of hybridization of wild tomatoes and understand why species – with few exceptions – don't interbreed and create new species.

Through that research, Bedinger has discovered the process of female tissue (pistils) recognizing and rejecting male tissue (pollen) from wrong species in wild tomatoes. The research group has also isolated genes that are important for this process in both pistils and pollen.

"With the genes we have discovered, we now have a molecular foothold, so we know we can build up other pieces of the machinery and look at how they interact," said Bedinger, who will lead the project. Other group members include scientists at the University of California-Davis, the University of Missouri and Indiana University. "Until now, we really didn't understand: How do these plants know that this is the wrong kind of pollen?"

Tomatoes and potatoes are very closely related species and behave similarly, Bedinger said.

Because of this, the work done in tomatoes could help create a potato that would be resistant to late blight, which is a condition caused by the Phytophthora infestans fungus. The fungus that caused the Irish potato famine is still a threat to major world populations that increasingly rely on potatoes as a food source.

Wild species of potato are resistant to late blight, but so far, no one has been able to engineer a cultivated potato that breeds stably for resistance to the fungus, Bedinger said.

"Every time a wild species is domesticated, you lose a lot of the genetic variability – people just select for bigger and bigger fruits or tubers, for example – which just causes a bottleneck where you lose important

genes, including disease resistance genes," she said. "Can we re-introduce these genes from the wild species into the cultivated species?"

Normally, wild species will reject the male pollen of cultivated species, so it is difficult to move genetic material from wild species into breeding programs. However, it may be possible to apply knowledge already gained about pollen rejection in tomato-to-potato.

"I'm really excited about it on both the basic and applied science levels," Bedinger said. "Can we understand how male and female tissues communicate with each other, and use what we've learned to make a difference with the potato?"

Provided by Colorado State University

Citation: Wild tomatoes could unlock secrets of fungus behind irish potato famine, researcher says (2012, February 22) retrieved 26 April 2024 from https://phys.org/news/2012-02-wild-tomatoes-secrets-fungus-irish.html