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Uganda: Sweet Genes Arm Banana Crops

Peter Wamboga-Mugirya 14 June 2010

Kampala — Scientists in Uganda have developed GM bananas that show promising resistance to the deadly banana Xanthomonas wilt (BXW) disease.

Bananas are Uganda's leading non-cereal crop with some 70 per cent of the population depending on it as staple food. More than US$200 million has been lost to BXW infestation since 2001. The disease has also been reported in Burundi, the Democratic Republic of Congo, Kenya, Rwanda and Tanzania.

Now, the banana plants modified with two genes derived from sweet peppers (Capsicum annuum) show resistance to the disease caused by the bacterium Xanthomonas campestris pv. musacearum.

Principal investigator Leena Tripathi, a Ugandan-based biotechnologist from the International Institute of Tropical Agriculture, Nigeria, said inserting the genes - plant ferredoxin-like amphipathic protein (PFLP) and hypersensitive response-assisting protein (HRAP) - separately in four local banana varieties is giving encouraging results (see GM bananas to fight wilt in Africa).

"In over five years of research, we've been able to insert genes into the East African highland banana varieties used for cooking (mpologoma and nakitembe), desserts (sukari ndizi) and brewing (kayinja). From these we've managed to develop resistant lines, which have proved effective in laboratory and screenhouse tests after deliberate exposure to BXW," Tripathi, who works on the project together with the Nairobi-based African Agricultural Technology Foundation and the National Agricultural Research Organization told SciDev.Net.

But, she added, they still need to confirm this effectiveness in a field trial.

Patrick Rubaihayo, a crop scientist at the Uganda-based Makerere University lauded the progress but warned of possible overdose with the molecule that these genes code for.

"My worry is that when a consumer eats large quantities of the modified varieties ... it is likely to be harmful," he said, adding that safety should be established before recommending these bananas for human consumption.

But Feng Teng-Yung, a plant pathologist at the Academia Sinica, a Taiwan-based research institute that provided the genes, said that they were safe. "Ferredoxin is a naturally-occurring protein in all living organisms," he said. "When we modify any plant with ferredoxin, we're only boosting amounts for greater protection against serious infections as bacterial pathogens."

Even if BXW-resistant bananas prove successful in field trials, the absence of a GM law in Uganda will hamper farmers' access to the technology (see Uganda 'needs biotech law' to save banana sector). The 2008 National Biotechnology and Biosafety Bill is yet to be presented to the cabinet for approval before it goes to parliament for enactment according to Michael Olupot-Tukei, assistant commissioner for planning and research in the Ministry of Finance, Planning and Economic Development.