



Kenyan Researchers Sow First Field of Transgenic Maize

ENCOURAGED BY RESULTS OF LABORATORY AND BIOSAFETY GREENHOUSE STUDIES, THE INSECT RESISTANT MAIZE FOR AFRICA PROJECT BEGAN FIELD TRIALS WITH TRANSGENIC MAIZE. EDITORIALS IN *THE NEW YORK TIMES* AND *THE INTERNATIONAL HERALD TRIBUNE* CALLED THE PROJECT "...A CAREFUL ENDEAVOR TO TEST GENETICALLY MODIFIED CROPS AND MAKE THEM WORK FOR THE SMALL FARMER."

On 27 May 2005, staff of the Kenya Agricultural Research Institute (KARI) sowed the first insect-resistant transgenic maize seeds into Kenyan soil, under confined field trial conditions at an open quarantine site (see "What Is an Open Quarantine Site," p. 16), as part of the Insect Resistant Maize for Africa (IRMA)¹ project. The first genetically modified maize grown in sub-Saharan Africa outside of South Africa, the experiment—and the project itself—are aimed at helping Kenyan farmers reclaim some of the 400,000 tons of maize grain they lose each year to stem borers.

A KARI-CIMMYT partnership begun in 1999, but built on decades of fruitful collaboration, IRMA uses conventional breeding and biotechnology to develop and offer locally-adapted, insect resistant maize varieties. The controlled field trial contained a maize variety that had been genetically modified with a

bacterium, *Bacillus thuringiensis* (Bt). The gene codes for a protein that impedes digestion in moth larvae like borers, and has served as the active ingredient in many organic pesticides since the mid-1900s. In contrast to South Africa, where Bt maize from private companies has been grown for nearly a decade, in Kenya the maize eventually delivered to farmers through IRMA will be free from legal restraints against planting or distributing saved seed. "It may seem trivial, but this type of contrast underlines the importance of IRMA, which applies cutting-edge science to benefit smallholders in Africa," says IRMA project manager and CIMMYT breeder Stephen Mugo.

The trial was intended to determine the effectiveness of different Bt genes and their combinations against four species of Kenyan stem borers under field conditions and to refine the

¹ IRMA is funded by the Syngenta Foundation for Sustainable Agriculture and the Rockefeller Foundation.



adaptation of the experimental varieties to Kenyan settings. The open quarantine trial site is a one-hectare plot on KARI's Kiboko research station 150 km southwest of Nairobi. Developed in 2003 under IRMA auspices, the facility features internationally accepted biosafety controls to ensure that plants and pollen stay within its confines.

WORLDWIDE ATTENTION ATTENDS THE PLANTING

The worldwide media spotlight shone on the trial planting, with some of the world's most influential and prestigious outlets covering the event. The BBC science and technology radio program *Discovery* featured interviews with KARI director Romano Kiome, Mugo, and KARI scientists Simon Gichuki and Catherine Taracha. Kiboko farmer Harrison Chuma spoke on the program about the myriad setbacks he faces to feed his household on his maize crop, qualifying stem borers as second only to drought in stealing yields: "Even when I use

irrigation on my maize, the stem borers stop me from harvesting what I should."

IRMA ARMS FARMERS AGAINST MULTIPLE THREATS

IRMA is also working to safeguard the maize harvests of Chuma and other smallholder farmers in Africa by endowing seed with resistance to another insect pest—the larger grain borer—that feeds on stored maize ears. Chemical controls for this insect are costly and potentially harmful to farm families and the environment. The associated lab and field work takes place at KARI's Kiboko, Embu, and Kakamega research stations.

Six IRMA maize varieties developed using conventional (that is, non-transgenic) sources of insect resistance are being grown in Kenya national maize performance trials, after successful completion of which some or all will be released for use by farmers.

SETBACKS BUT STEADY PROGRESS

The project has not been completely free from problems. For example, because of an experimental error—the application of a systemic pesticide to one of the Kiboko test plots in mid-June—that plot had to be harvested prematurely. After Kenya's National Biosafety Committee (NBC) and the Kenya Plant Health Inspectorate Service (KEPHIS) granted the required permissions, the trial was replanted.

As the editorial in *The New York Times* asserts, "The Kenya study is a model of how to do it and a warning about how difficult adapting this technology for poor farmers will be." IRMA will only succeed with "...financing and permissions ... help from governments and foundations, and cooperation from biotech concerns."

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