

farming for tomorrow

# African research beats MAIZE-STREAK VIRUS

Finally, there's a genetically modified maize strain with tolerance to the maize-streak virus, the most devastating pathogenic viral disease facing Africa's small-scale and commercial farmers. Field trials are pending, but Pannar and University of Cape Town scientists are confident, reports **Lloyd Phillips**.

IT TOOK 14 YEARS FOR UNIVERSITY of Cape Town (UCT) scientists and Pannar molecular plant breeders to develop a genetically modified maize strain with maize-streak virus (MSV) tolerance.

This internationally acclaimed breakthrough could significantly reduce food insecurity in Africa. In a scientific paper, the project's collaborators explain that maize is one of Africa's staple food crops, making up over 50% of total caloric intake in local diets. MSV can wipe out 5% to 100% of a farmer's crop.

Described as the first GM crop developed solely by Africans for Africans, the maize plants are still awaiting field testing, but

have shown remarkable tolerance to MSV under controlled greenhouse conditions.

The project was led by Dr Dionne Shepherd, from UCT and Dr Rikus Kloppers, a plant pathologist and technical services manager with Pannar Seeds. Dr Shepherd's team included Prof Jennifer Thomson and virologist Prof Edward Rybicki, while Dr Kloppers led a team of molecular breeders.

#### The chlorophyll killer

According to Dr Kloppers, MSV is transmitted to susceptible maize plants through the bite of the African leafhopper (*Cicadulina mbila*), feeding on the plants. Reports say that MSV lives in grasses native

to sub-Saharan Africa. When maize was introduced to the continent in the 16th century, the virus adapted to attack it.

MSV attacks chlorophyll, leaving whitish-yellow lines running along the veins of maize leaves, and impeding the plant's ability to photosynthesise nutrients. This results in stunted plants that produce poor, or no cobs. If attacked at a very young age, maize plants can wither and die.

"This MSV-tolerant maize strain could be a huge boost for African maize farmers, especially small-scale or subsistence producers who have a greater chance of losing their entire crop to MSV than large-scale farmers do," explains Dr Kloppers.

"Small-scale maize farmers' lands are often surrounded by natural bush where leafhoppers shelter. They can feed on and infect the maize at will, and these farmers and their families can lose a major portion of their food for the next year.

**BELOW:** Transmitted to maize plants through the bite of the African leafhopper insect, MSV can stunt the growth of maize crops. If a maize crop is very young when infected, it may even wither and die.

**BOTTOM LEFT:** Dr Rikus Kloppers, a plant pathologist and technical services manager with Pannar Seeds. He was one of the scientists from his company and the University of Cape Town who successfully developed the MSV-tolerant maize crop. If approved for commercial use, this crop could play a major role in improving Africa's food security.

PHOTOS: COURTESY OF DR RIKUS KLOPPERS



