

Tracking traits for new varieties by DNA

ANY GOOD ARTISAN SHOULD understand the origins of their tools, and how these affect the tools' abilities. Likewise, farmers should understand the origins and properties of the crops they grow. They need to have the best varieties available for their specific production conditions and consumer preferences.

South Africa currently has an estimated 2 627 200ha of land under maize. In comparison, the Kruger National Park is just under 2 million hectares. Hundreds of thousands of hectares are also planted to other crops. From ancient times until the late 20th century, conventional plant-breeding methods were the central tools for developing new and improved crop

varieties. However, they're time consuming and labour-intensive, and can be imprecise.

Today, scientists are making great strides using marker-assisted breeding, more correctly known as marker-assisted backcrossing (MAB) and marker-assisted selection (MAS).

"MAB and MAS are more efficient methods of developing new conventional and genetically modified crop varieties," says Felix Middleton, Pannar Seeds' molecular plant breeder. "They allow us to keep up with the constantly changing production conditions of our farmers and the consumers of their products."

According to website Wikipedia, MAS uses a marker, be it morphological, biochemical or a DNA/RNA variation, to indirectly select for the genetic determinant(s) of a desired trait. These traits

Production conditions and consumer preferences are changing, and crops must be developed at the same rate or faster to effectively meet these demands. In both biotech and conventional breeding, scientists can now use genetic markers to track the traits they want in new crop varieties. **Lloyd Phillips** reports.

can include better productivity, disease resistance, stress tolerance, and quality.

"The practical implementation of biotechnology, of which MAB and MAS are a part, only really left university laboratories and entered use in private institutions 10 years ago," says Middleton. "But it has changed the face of crop breeding for commercial purposes."



Pannar's Dr Elizma Joubert and Felix Middleton in a greenhouse with trays of young maize seedlings, which will be used for DNA extraction. Marker-assisted backcrossing will be used to find desirable traits that can be incorporated into new and improved maize varieties.

PHOTOS: LLOYD PHILLIPS

