

# DNA marker technology for efficiently breeding cassava mosaic disease-resistant lines and supporting stable cassava production

Production

Demonstration

Item: Cassava

Chemical pesticide reduction  
Labor productivity enhancement

## Outline

Cassava mosaic disease (CMD) is a severe viral disease that reduces the growth and yield of cassava, a major tropical crop. We developed DNA markers\* for accurately and efficiently identifying cassava plants that are resistant to CMD to help ensure stable cassava production.

\* A DNA marker is a slight DNA difference linked to a useful trait such as disease resistance, which serves as an indicator to help breeders more efficiently select plants with a certain trait.

## Background/effect/note

Cassava (*Manihot esculenta*) is a staple food consumed by approximately 800 million people worldwide. Cassava is also the most widely cultivated root crop in tropical regions. Therefore, stable cassava production is essential for global food security. CMD is transmitted by whiteflies and is one of the most damaging crop diseases in Africa and Southeast Asia. Controlling the virus once in the field is difficult, often resulting in yield losses of approximately 15%–75%. Using resistant varieties is the most effective strategy for preventing cassava losses due to CMD, stabilizing production, and reducing reliance on chemical pesticides (Fig. 1). We developed DNA markers that allow cassava breeders to efficiently identify CMD-resistant lines in breeding populations and facilitate the development of resistant varieties. These markers can be used to reduce the cost and effort of conventional field screening and disease testing for resistant varieties, which typically require several years. The method markedly increases the accuracy and efficiency of variety selection compared with traditional methods (Fig. 2).

These markers are ready to use in breeding programs in regions affected by CMD, such as Africa and Southeast Asia. We plan to promote technology transfer and strengthen collaborations with local research institutions to implement these DNA markers in practice.



Fig. 1. CMD-susceptible lines exhibit leaf stunting and mosaic symptoms, whereas resistant lines show no symptoms.

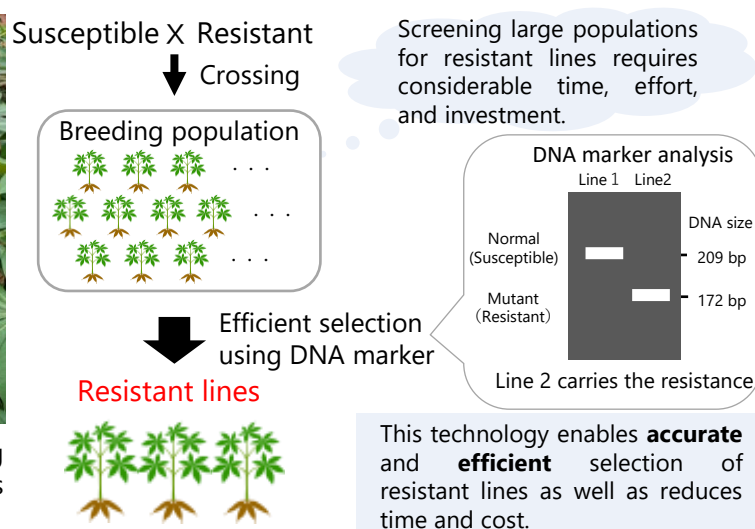


Fig. 2. DNA marker selection of CMD-resistant lines. These markers are used with a molecular biology method to detect slight differences in DNA associated with CMD resistance.



Technical details:

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