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Development and Characterisation of Virus Resistance in Cassava Against Cassava Mosaic Viruses

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Abstract

Cassava production in Africa is seriously hampered by the occurrence of a number of different whitefly transmitted viruses causing mosaic diseases and leading to serious decline of the crop and drastic yield reductions. The typical viruses of cassava have diverse genomes are constantly evolving and can occur in single and in mixed infections often leading to complete loss of the harvest. Host plant resistance is to date the sole and most dependable approach to combat the disease. Several cassava genotypes have been found with a high degree of natural resistance against cassava mosaic viruses in the field. To test the spectrum of resistance against viruses occurring in diverse geographies in Africa, we have made an inventory of all major viruses occurring in different cassava growing regions, characterised their genomes and assessed variability and disease phenotypes. Cassava breeding lines were biolistically inoculated with cloned viruses to cause infections with all viruses in single or in mixed infections allowing screening for resistance under laboratory conditions. With this, infections in cassava rated highly resistant under field conditions was reached, however, after initial virus replication and symptom development, plants recovered and virus infections were down regulated and then aborted. In several breeding lines, resistance was maintained against a number of viruses while resistance breakdown was also found in cassava clones. This was most severe in plants lines where cassava mosaic mixed virus infections were introduced. Screening for resistance in cassava under laboratory conditions permits the early identification of promising breeding lines, the exact determination of virus resistance characteristics, to define the resistance/tolerance status and to deploy cassava lines into geographic horizons with known virus resistances. The development of resistance in cassava against Cassava mosaic viruses will be discussed.

Keywords: Cassava mosaic virus, cassava resistance, diversity, resistance screening

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