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First Report of Natural Infection by Cassava Polero-Like Virus (Family: Luteoviridae) of Cassava in Colombia

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Abstract

Cassava (*Manihot esculenta* Crantz) production in Colombia can be severely affected by a complex of viruses. Among these, the ubiquitous presence of cassava polero-like virus (CsPLV; Family Luteoviridae; tentative genus *Polerovirus*) suggests the potential of aphids as virus vectors in cassava, since all known members of the family Luteoviridae are transmitted by this type of insects. To ascertain whether CsPLV can be acquired naturally, a total of 270 virus-free cassava plants of two different genotypes (CM4919-1 and CM6740) were planted in two important cassava growing regions in Colombia during 2014: Sucre (North Coast) and Valle del Cauca (South/Center). Another 28 plants were kept in an insect-proof greenhouse at the International Center for Tropical Agriculture (CIAT). Four months after planting, total RNA was extracted from leaf samples and CsPLV was detected by RT-PCR. Forty eight percent (48 %) of the material planted in the field became infected and the expected 1140 bp PCR amplicon that encompasses the 3' end of P2 (Replicase), an inter-genomic region and the 5' end of P3 (coat protein) and P4 (tentative MP-VPg) was cloned and sequenced. Nucleotide sequence analysis showed that isolates collected in this work have 93–96 % identity to previously reported CsPLV isolates and form a separate phylogenetic group (Accession Nrs: KC505249.1). Furthermore, the virus-free cassava plants taken to Sucre and Valle del Cauca became infected by distinct phylogenetic groups of CsPLV isolates whose sequences indicated geographically independent infection events. Additionally, none of the control plants maintained in the insect-proof greenhouse developed CsPLV infection. These results together, indicate that horizontal transmission of CsPLV happens in the field at a significant rate that is comparable to rates reported for other Luteoviruses. The identification of the vector(s) needs further investigation. This is the first report of natural infection of cassava by CsPLV. The high incidence and early infection of CsPLV may contribute to the accumulation of mixed virus infections leading to significant cassava yield losses in the region.

Keywords: Cassava, epidemiology, natural infection, virus