First Report of Sugarcane Streak Mosaic Virus Infecting Sugarcane in Côte d'Ivoire

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Sugarcane streak mosaic virus (SCSMV; *Poacevirus*; *Potyviridae*) is the causal agent of streak mosaic disease of sugarcane (*Saccharum* interspecific hybrids), a major industrial crop widely cultivated in tropical and subtropical regions for sugar and ethanol production. It was first reported by Hall et al. (1998) from quarantined germplasm material exhibiting mosaic symptoms imported from Pakistan into the USA. Subsequently, it was also reported in most Asian countries, such as Bangladesh, India, Indonesia, Iran, Sri Lanka, Thailand, Vietnam, and China (Chatenet et al. 2005; Hema et al. 2002; Kasemsin et al. 2016; Moradi et al. 2018; Putra et al. 2014; Xu et al. 2010; Zhang et al. 2018). Until now, there is no report of SCSMV outside Asia. From February to October 2018, sugarcane plants exhibiting symptoms such as irregular yellow and green mosaic, interveinal chlorotic specks, and streaks were observed in Bafing (Borotou-Koro), Marahoué (Zuénoula), and Tchologo (Ferkéssédougou), Côte d'Ivoire. Varieties under large-scale commercial cultivation such as R570, R579, SP711406, Co997, Co449, M1176/77, M2593/92, M2580/95, and M1400/86 were all symptomatic. A total of 94 sugarcane leaf samples were collected; among those, 82 showed symptoms and 12 were symptomless. Samples were first tested for sugarcane mosaic virus (SCMV), which causes mosaic a disease that is already present in Africa. Serological tests with infected sap using a DAS-ELISA kit (DSMZ, RT-0166) were negative for SCMV, and no amplification product was obtained by RT-PCR using

primers specific to the coat protein (CP) gene of SCSMV (Putra et al. 2003). The 82 symptomatic leaves tested positive by DAS-ELISA with SCSMV antiserum (polyclonal antibodies were graciously provided by Prof. M. Hema of Sri Venkateswara University), whereas the 12 symptomless samples tested negative. To confirm results, virus-free greenhouse-grown sugarcane varieties Co997 and M1176/77 were mechanically inoculated with 10 sap extracts from 10 SCSMV-infected sugarcane leaf samples. Sap was also extracted from DAS-ELISA-negative sugarcane leaves and used as negative control. For sap preparation, leaves were homogenized with a mortar in 2 ml of phosphate buffer, 0.01 M, pH 7.2 (ratio 1:10). Fifteen 4-week-old plants per variety were inoculated separately with each sap. All inoculated plants exhibited streak mosaic symptoms 13 days postinoculation, and the presence of SCSMV in the inoculated plants was confirmed by DAS-ELISA. Total RNA was extracted from four symptomatic leaf samples, one symptomless sample, and one DAS-ELISA-positive sample using TRIzol reagent (Invitrogen). cDNA was synthesized using M-MLV reverse transcription (Promega, M1705) following the manufacturer's instructions. A 690-nt fragment of the CP gene was amplified by RT-PCR with primers SCSMV-F690 and SCSMV-R690 (Viswanathan et al. 2008). All primers were synthesized by Eurogentec. Aliquots of RT-PCR products (5 µl) were analyzed by electrophoresis on 1.2% (w/v) agarose gel, stained with ethidium bromide, and visualized on a UV transilluminator. An amplification product of the expected size was obtained for all five symptomatic or DAS-ELISA-positive samples but not for the symptomless sample. Two RT-PCR products were sequenced and deposited in GenBank (LR594547, LR594582). These partial CP gene sequences shared highest nucleotide identity with two isolates of SCSMV from India in GenBank (91% with JN315855 and 90% with EF655859), thus confirming that SCSMV was occurring in sugarcane in Côte d'Ivoire. To our knowledge, this is the first report of natural infection of sugarcane by SCSMV in Africa. Streak mosaic is a serious threat to the entire sugar industry in West Africa and needs further investigation, as it may affect sugarcane yields and impact local economies. Our findings further illustrate the need to develop virus-free germplasm for local, national, and international distribution of sugarcane.

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