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## Identification of RNA Viruses Causing Sugarcane (*Saccharum officinarum* L.) Mosaic Disease by Simultaneously Multiplex-RT-PCR

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This study aims to determine the type of RNA viruses that cause mosaic disease in four sugarcane varieties in Indonesia based on simultaneous detection using multiplex-RT-PCR as well as relationship between types of RNA viruses that cause mosaic disease in four varieties of sugarcane in East Java, Indonesia from the analysis of cp gene sequence. The results showed that there were two types of RNA viruses, SCMV and SCSMV, which caused mosaic disease in four sugarcane varieties at four locations in East Java, Indonesia based on RT-PCR molecular detection either singleplex-RT-PCR or multiplex-RT-PCR. Molecular detection using the multiplex-RT-PCR method is considered superior to singleplex-RT-PCR because it is able to diagnose several types of RNA mosaic sugarcane at once, so it is more practical and time saving. SCMV that attacked sugarcane plantations in East Java, Indonesia on two sugarcane varieties namely Ps 864 (Magetan district) and Ps 881 (Madiun district) is a SCMV cluster closely related to the SCMV isolate (EU196453.1) from Argentina. SCSMV that attacked sugarcane plantations in East Java, Indonesia on four sugarcane varieties namely Ps 864 (Magetan district), Ps 881 (Madiun district), Ps 862 (Situbondo district), and NXI 1-3 (Jember district) is a SCSMV cluster closely related to the SCSMV isolate (AB563503.1) from Indonesia. RNA viruses that cause sugarcane mosaic disease in Indonesia, SCMV and SCSMV, can be detected simultaneously by multiplex-RT-PCR method

**Keywords:** SCMV, SCSMV, mosaic disease, sugarcane, RT-PCR.

### INTRODUCTION

Sugarcane (*Saccharum officinarum* L.) is one of the major commercial crops grown widely in the tropics and subtropics of the world. Sugarcane is also one of the important industrial crops in Indonesia with an area of about 400,000 ha with an average production of 60-70 tons of sugarcane per ha (Putra et al. 2013). There are many factors responsible for the production decline, one of which is the presence of pests and diseases.

A number of pathogens capable to attacking

sugarcane include viruses, fungi, bacteria, and nematodes, and among these pathogens, the virus, is one of the leading causes of endemic diseases to consistently and significantly lead to a decrease in world sugar production (Li et al. 2008, Parameswari et al. 2013). Sugarcane mosaic disease is one of the endemic diseases caused by the virus first identified in 1892 and it was apparently caused by Potyvirus (Artschwager and Brandes, 1958). In a subsequent report, it has been identified that the mosaic disease of sugar