

Mixed infection of sugarcane streak mosaic and sugarcane yellow leaf virus infecting sugarcane crops in Andhra Pradesh, India

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ABSTRACT

During survey of sugarcane crops of Andhra Pradesh in 2004-05, incidence of mosaic symptoms and midrib yellowing symptoms were observed in promising commercial sugarcane cultivars. The incidence of 6 to 30% was observed in farmer's fields for the first time in the month of August during the year 2004. Disease incidence was also observed in the range of 2 to 36% in some of the clones in the germplasm. These infected samples were found antigenically similar to sugarcane streak mosaic virus as well as sugarcane yellow leaf luteo virus. The results were confirmed either by DAC-ELISA, DIBA and TIBA together or by any these serological tests in suspected samples. The sugarcane yellow leaf virus particles measured about 25 to 30 nm in diameter and sugarcane streak mosaic virus particles measure about 480-600 nm. The mosaic isolate reacted with sugarcane streak mosaic virus-AP isolate (SCSMV-AP, antiserum), recently reported from South India in DAC ELISA and DIBA test. The mosaic infected leaves with or without midrib yellowing symptoms were also analysed with antiserum of sugarcane yellow leaf luteo virus. The results were positive in DAC-ELISA and TIBA. Hence it was concluded that mosaic and midrib yellowing observed on many varieties of sugarcane in Rudrur, Andhra Pradesh is caused by sugarcane streak mosaic virus and sugarcane yellow leaf luteo virus.

Key words: Sugarcane streak mosaic virus, Sugarcane yellow leaf virus, Mixed infection, Sugarcane

INTRODUCTION

Sugarcane is an important food cum cash crop and is the third largest crop in terms of value next to rice and wheat in India. It is susceptible to several biotic stresses in nature (Rott *et al.*, 2000). Among the viral diseases mosaic disease caused by sugarcane mosaic virus and sugarcane streak mosaic virus is widely prevalent in almost all sugarcane growing states of the country (Rao *et al.*, 2002). Incidence of the mosaic disease is very severe in major sugarcane growing states of Uttar Pradesh, Maharashtra, Bihar, Tamilnadu, Gujarat, Haryana and Andhra Pradesh. Even 10 to 15% loss due to this disease is highly significant because of excessive cultivation of the crop (Singh *et al.*, 1997; Vishwanathan, 2002).

Sugarcane streak mosaic virus (SCSMV) is recently described disease (Hema *et al.*, 1999) and is known to infect sugarcane, wheat and sorghum. During a recent survey of sugarcane crops in AP, mosaic incidence and midrib yellowing was observed in many varieties of sugarcane viz., Co 86010, 83 A 30, Co 85036, Co 92013, Co 6907, CoC 671, Co 7219, 97 R 183, 97 R 272, 97 R 134, 98 R 145. Hence there is a need to characterize these virus isolates from affected sugarcane plants from AP. We report here antigenic relatedness of mosaic and yellow midrib isolates of sugarcane collected from different regions of AP, India.

Incidence of sugarcane yellow leaf luteo virus (SCYLV) has not been reported in Andhra Pradesh except a few earlier reports from South India (Vishwanathan and Balamuralikrishnan, 2004). Hence preliminary observation was undertaken in some of the infected sugarcane varieties in the Northern Telangana zone of Andhra Pradesh on its occurrence detection and observations are reported here.

MATERIALS AND METHODS

Sugarcane growing areas of Andhra Pradesh were surveyed. Mosaic and yellow midrib affected samples from different countries listed in Table 1 were collected and subjected to serological assay by direct antigen coated enzyme linked immunosorbent assay (DAC-ELISA), TBIA. The samples showing varying severity with interveinal chlorotic specks, streaks or stripes especially on young leaves of sugarcane has been prevalent in almost all varieties including some showing midrib yellowing of mature leaves with a distinctive strong yellow midrib on the lower (abaxial) surface but gradually spreads laterally into it, drying starting at the tip and progressing down towards the base of leaf. The samples of sugarcane showing both types of symptoms were collected, stored in plastic bags at 4° C and processed within 7-8 days for leaf dip preparations and serological experiments. Cultures of the virus isolates causing mosaic disease and yellow midrib of commercial varieties around Andhra Pradesh was maintained on sugarcane in earthen pots.

The electron microscope examination of the leaf dip preparation on infected leaves showing the above mentioned symptoms were found to contain flexuous filamentous particles measuring about 400-600 X 13 nm and the particles of member of the luteo viride group are hexagonal in outline with diameter varying from 30 to 45 nm. The identification by leaf dip preparations resembled mixed infections of both viruses. Keeping this in view the identification and distribution of the casual virus was attempted in the present investigation.

Leaf dip preparation :

Small pieces of infected leaf tissues were cut and

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