

Biological and molecular characterization of a geminivirus affecting pepper plants in Egypt

(Received: 10. 08. 2014; Accepted: 15. 10 .2014)

El-Gaied L. F. *, El-Sherif N. A. ** and Salem R. E. ***

*Departement of Microbial Molecular Biology, Agricultural Genetic Engineering Research Institute (AGERI), ARC, Giza, Egypt

**Botany Department, Faculty of Science, Ain Shams University, Cairo, Egypt

***Departement of Plant Molecular Biology, Agricultural Genetic Engineering Research Institute (AGERI), ARC, Giza, Egypt

ABSTRACT

Pepper (*Capsicum annuum* L.) is one of the most economically important crops in Egypt. Viruses form a major threat to pepper yield in Egypt causing severe economic losses. Plants exhibiting virus-like symptoms (VLS) were collected from the field and subjected to ELISA tests using three different antisera, namely C4 antiserum specific for tomato yellow leaf curl virus (TYLCV), TYLCV polyclonal antiserum common for any whitefly transmitting geminiviruses (WTGs) and Faba Bean Necrotic Yellows Nanovirus (FBNYV). Plants were also tested by PCR with WTGs specific primers. Positive results suggested that the pepper plants were infected with a virus belong to WTGs viruses. Experiments proved that the virus could be transmitted by viruliferous whiteflies, mechanically and by grafting. Inoculated pepper plants with viruliferous whiteflies exhibit curling, downward cup shape, deformation of leaves and stunting of infected plants. PCR was also carried out for the inoculated plants using primers specific to TYLCV coat protein gene and a negative amplification obtained, indicating that the virus under this study is not the previously characterized TYLCV isolate. Host range experiments were carried out to determine possible hosts of the virus; tomato, tobacco, cotton, faba bean and zucchini plants. Symptoms were recorded and results were confirmed by PCR. The virus was further characterized by studying nucleotide sequences isolated from the virus genome sequence by amplification fragments from VI and V2 sequences. Viral sequence was blasted to the GeneBank database sequences and the most homologue sequences were used to build the phylogenetic tree which showed that the sequence is very near at the molecular level to TYLCV isolates which suggest that it could be derived from these isolates. The isolated virus was given the name pepper leaf curl geminivirus (PeLCV).

Key words: Pepper, ELISA, Geminivirus, TYLCV, PeLCV.

INTRODUCTION

Pepper (*Capsicum* spp.), which belongs to the family *Solanaceae*, originated in Mexico, southern Peru and Bolivia and now is grown worldwide under various environmental and climatic conditions

(Martelli and Quacquarelli 1983). Pepper is considered to be a high value crop since it is packed with several nutrients and it is a good source of vitamin C; it also contains a large amount of phytochemicals that have exceptional antioxidant activity (Bosland and