

Molecular Detection and Genetic Analysis of begomoviruses Causing Leaf Curl Disease in Okra (*Abelmoschus esculentus* L.) Moench in Basrah, Iraq

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Received 8th January 2026; Accepted 1st June 2026; Available online 29th June 2026

Abstract: Okra (*Abelmoschus esculentus* L.) serves as a vital vegetable crop for both Iraq and global markets, as its nutritional value is complemented by its ability to grow in hot environments. Okra productivity has lately decreased due to many diseases, most notably viruses like begomoviruses carried by the whitefly *Bemisia tabaci*. Thirty-five leaf samples were gathered from several sites, including Karmat Ali, Abu Al-Khasib, and Al-Madina, during the 2023 crop season in Basrah Province, southern Iraq. Total DNA was extracted using the modified CTAB method and the DNA-A component (~1400bp) was amplified by polymerase chain reaction (PCR) using degenerate primers PAL1v1978/PAR1c496. The PCR results revealed that begomoviruses caused 60% infection rate. The highest infection was recorded in Karmat Ali by 83%. On the other hand, two begomoviruses, the *Cotton leaf curl Gezira virus* (CLCuGeV), (PX698543) and the *Tomato yellow leaf curl virus* (TYLCV), (PX698541, PX698542), were found by sequencing and analyzing three amplicons. Those viruses can be transmitted via the whitefly across different regions. The CLCuGeV isolates showed high nucleotide identity between 95-99 with isolates from Iran, Pakistan, and Iraq. Meanwhile, the TYLCV isolates exhibited 93–98% identity with isolates from China and Iraq. This genetic diversity suggests multiple regional introduction pathways. The results provide molecular evidence for the presence and wide distribution of begomoviruses infecting okra in Basrah province. These findings highlight the urgent need for continuous molecular surveillance and the implementation of integrated management strategies, including vector control and the use of resistant cultivars to limit future outbreaks of these viruses.

Keywords: *Begomovirus*, Leaf curl disease, Okra (*Abelmoschus esculentus*).

Introduction

infecting okra plants, a total of 35 leaf samples exhibiting characteristic In Iraq, there are 56,054 donums that were

cultivated with okra in 2022. They represent a 6,046 donum increase from 2021; production scored 88,843 tons with