

Expression of Gro-El under Phloem-Specific Promoter Protects Transgenic Plants against Diverse Begomovirus-Beta Satellite Complex

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Abstract : Cotton leaf curl disease (CLCuD) is the major threat to the cotton crop and is transmitted by whitefly (*Bemisia tabaci*). Since multiple begomoviruses and associated satellites are involved in CLCuD, approaches based on the concept of broad-spectrum resistance are essential for effective disease control. Gro-El and G5 are two proteins from whitefly endosymbiont and M13 bacteriophage origin, respectively. Gro-El encapsulates the virus particle when it enters the whitefly and protects the virus from the immune system of the whitefly as well as prevents viral expression in it. This characteristic of Gro-El can be exploited to get resistance against viruses if expressed in plants. G5 is a single-stranded DNA binding protein, expression of which in transgenic plants will stop viral expression on its binding with ssDNA. The use of tissue-specific promoters is more efficient than constitutive promoters. Transgenics of *Nicotiana benthamiana* for Gro-El under constitutive promoter and Gro-El under phloem specific promoter were made. In comparison to non-transgenic plants, transgenic plants with Gro-El under NSP promoter showed promising results when challenged against cotton leaf curl Multan virus (CLCuMuV) along with cotton leaf curl Multan beta satellite (CLCuMB), cotton leaf curl Khokhran virus (CLCuKoV) along with cotton leaf curl Multan beta satellite (CLCuMB) and *Pedilanthus* leaf curl virus (PedLCV) along with Tobacco leaf curl beta satellite (TbLCB).

Keywords : cotton leaf curl disease, whitefly, endosymbionts, transgenic, resistance

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