

Geminiviruses for biotechnology: the art of parasite taming

Viruses are intracellular pathogens that have evolved efficient strategies for replication and expression of their proteins in the host cells. Geminiviruses – plant viruses with small circular single-stranded DNA genomes – effectively manipulate plant cell processes for viral functions, entailing great potential for biotechnological applications. This potentiality has been realized in the form of protein expression and gene-silencing vectors, and, more recently, vectors for genome editing – a technology that these viruses seem particularly well-suited to facilitate. This insight offers an overview of the biological properties of geminiviruses, with emphasis on those leveraging development of geminivirus-based replicons. It illustrates the basis for engineering geminivirus-based replicons and their applications. Furthermore, it discusses the reported use and future perspectives of geminivirus-based replicons for genome editing.